

GREEN-2024

СТУДЕНЧЕСКИЕ ИССЛЕДОВАНИЯ В ОБЛАСТИ ЭКОЛОГИИ, ИНЖЕНЕРИИ И ПРИРОДЫ – 2024

СБОРНИК НАУЧНЫХ ТРУДОВ
молодежной научно-практической конференции
на иностранных языках
с международным участием

Москва, 28 ноября 2024 г.

В двух частях

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GREEN-2024

GRADUATE RESEARCH IN ECOLOGY, ENGINEERING AND NATURE – 2024

Proceedings
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Youth Scientific and Academic Conference

Moscow, November 28, 2024

In Two Parts

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Москва
Российский университет дружбы народов
им. Патриса Лумумбы
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ИМЕНИ ПАТРИСА ЛУМУМБЫ»

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ECOLOGICAL ASSESSMENT OF SUBAQUATIC SOILS IN THE GULF OF FINLAND

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Abstract. The aquatic vegetation of the Neva Bay is characterized by high biodiversity and play an important role. In recent years, hydrotechnical works associated with transport and industrial construction have been carried out in the Gulf of Finland. As a result of industrialisation and active anthropogenic impact these areas are a place of hyperaccumulation of nutrients and pollutants. This paper presents results of the ecotoxicological state assessment of subaquatic soils and investigation of the development of macrophyte thicket ecosystems of the Neva Bay.

Key words: subaquatic soils, ecotoxicological state, heavy metals, Gulf of Finland, aquatic vegetation

INTRODUCTION

The coastline of the Neva Bay of the Gulf of Finland is characterized by a significant development of macrophyte vegetation. The total area of the main aquatic thickets in the Neva Bay is currently 1,214 ha [1]. The higher aquatic vegetation communities of the Neva Bay are characterized by high biodiversity and play an important, multifaceted ecological role.

In recent decades, active hydraulic engineering works have been carried out in the waters of the Gulf of Finland's Neva Bay, mainly related to transport and industrial construction. In addition, depth support works are carried out annually on inland waterways in significant, not precisely known volumes. The number of artificially formed areas is also accelerating. Hydrotechnical works often have a strong negative impact on the thicket communities. Water turbidity and subsequent sedimentation of suspended sediments worsen the living conditions of hydrobionts, depress aquatic vegetation, disable fish spawning and rearing areas, loose their food base, lead to the loss of migration and nesting sites for birds, and inhibit water purification processes [2].

A comprehensive assessment of the impact of hydraulic engineering works on overgrown ecosystems, on the substrates, their properties and characteristics, on which these valuable thickets of higher aquatic vegetation grow and on which spawning and nursery of young fish of many species takes place is possible only when taking into account the processes of their spatial and temporal dynamics on the scale of the entire Neva Bay and the adjacent water area. In this case we are talking about subaquatic soils of the coast of the Neva Bay of the Gulf of Finland, which are favorable substrates for the growth and development of thicket communities that are periodically flooded.

Hydromorphic and semi-hydromorphic landscapes are areas of increased biogeochemical activity. As a result of industrialization and active anthropogenic impact these territories are a place of hyper-accumulation of various biogenic and polluting substances. Not only a directional change of general parameters along the gradient from sea to land, but also a constant change of conditions at each point is revealed. This process represents an important ecological problem for the region, as it leads to eutrophication of the water body, which is observed in the water area of the Neva Bay every season. As a result of eutrophication and algal blooms, the quality of water in the reservoirs decreases, which leads to deterioration of the quality of life of the local population and the quality and quantity of agricultural production. This requires the reaction of modern science and justification of effective decision making.

METHODOLOGY

Subaquatic soils with their vegetation reveal themselves as one of the sectors of the global biogeochemical cycle with inherent ratios of chemical elements.

Therefore, it is obvious that for a comprehensive assessment of the state of very valuable from the point of view of biological diversity overgrown ecosystems of coastal landscapes, as well as further adequate assessment of damage from the impact of hydraulic engineering works on the aquatic vegetation ecosystems and selection of compensatory conservation measures, it is necessary to know and take into account properties and ecotoxicological state of subaquatic soils of the studied

coastal landscapes; and peculiarities of dynamics of thicket communities in the Neva Bay depending on the level of anthropogenic factor impact.

For the purpose of the research, the thickets of higher aquatic vegetation were preliminarily divided into 3 categories according to succession stages: (1) Long-established; (2) Relatively unstable, having emerged before the establishment of the St. Petersburg Flood Protection Complex (FPC); (3) Relatively recent; (4) Overgrowth that has occurred directly near the FPC and far from it.

Three types of water areas were identified for each of these categories: (a) The first — outside the influence of hydraulic engineering works and with minimal action of other anthropogenic factors (undisturbed state), (b) The second — outside the influence of hydraulic engineering works with an average level of other anthropogenic factors (background state), (c) the third — in the zone of influence of hydraulic engineering works under the average level of action of other anthropogenic factors (impact state).

According to the position of the sites in relation to the St. Petersburg Flood Protection Complex, the sites were divided into: A — distant from the Flood Protection Complex, B — adjacent to it.

Thus, the zones for the search of reference sites covered the following 14 combinations of successional stage and level of impact.

RESULTS

The majority of the survey area is located on reclaimed land in the coastal zone of the Gulf of Finland and is therefore technogenically transformed. In the Gulf of Finland coastal zone alluvial sandy sediments may fragmentarily contain psammozems, which belong to the underdeveloped soils department and represent a bedding-peat horizon lying directly on the sandy soil-forming rock. Areas of unconfined sands may also be common in parts of the coastline.

On the vast part of the study area the areal of marsh phytocenoses was formed. With some protection from the processes of tidal and surge forces, against the background of general hydromorphic and stagnant water, this area is subject to waterlogging processes, marsh soils have not yet had time to form.

Biocenoses of marine coasts are mainly experiencing high anthropogenic pressure. Among the different ecosystems, coastal and marine ecosystems are exposed to anthropogenic environmental factors, which include tourist visits, land reclamation and agricultural land development.

The modern period of soil formation on the territory of the region began after the melting of the glacial cover about 12 thousand years ago. Glacial waters left behind various forms of relief (kams, ozy, drumlins, zvontsy, etc.) and a cover of Quaternary rocks of variegated lithological composition and heterogeneous composition, which became mother rocks for modern soils. Marine transgressions levelled the glacial relief in the part of the territory adjacent to Lake Ladoga, the Gulf of Finland and the Neva River, bounded by the indigenous shore of the ancient sea — glint.

In the conditions of increasing anthropogenic pressure on landscapes, it is necessary to protect soils, which fulfil the functions of preserving the gene pool of natural plants, microorganisms, insects and animals typical of the region's ecosystems.

Soils of sea coasts are doubly influenced by land on the one hand and water on the other. This is manifested both in the specificity of geomorphological processes and in the geochemical fluxes of substances that come from both land and sea water. Due to this, soils located in the intertidal zone are characterized by complex genesis and dynamic development.

On the coast of the Gulf of Finland, the forest rarely comes close to the littoral, but very often a strip of seaside meadows is formed between the littoral and the forest. In areas with wind-protected shores, seaside meadows occupy large areas, extending some distance to the sea. During surge winds or tidal waters, these areas are flooded by sea water for a short period of time and are largely submerged. Here, marsh soils are formed under plant communities of near-water phytocenoses in close proximity to the sea.

Marsh soils are peculiar subaquatic soils of deltaic melts and coastal marches, which develop under the influence of tidal or surge waters. The peculiarity of marsh soils is conditioned by their almost permanent flooding. Soil profile is not differentiated, there is only one AC horizon enriched with humus and reducing compounds.

CONCLUSIONS

As a result of the conducted research, a method of integrated assessment of the ecological value of subaquatic soils and melts was developed, which provides a reasonable quantitative approach to selecting a regime for their protection and use. It was found that the man-made fluvial lands (resulting from the alteration of the marine environment by hydro-construction) provide a full-fledged replacement of fluvial ecosystems lost during hydro-construction after the latent initial period of their succession. The greatest value is demonstrated by the melts outside the zones of hydraulic works impact and those formed due to stimulating effects of hydraulic works more than 15 years ago (the latter are more resistant to anthropogenic impacts). Younger thickets, resulting from the stimulating effects of hydraulic construction, have a lower ecological value and provide an incomplete set of ecosystem services. Their potential is revealed only gradually, after a latent primary formation period of more than 10–15 years. In addition, a quantitative inventory of the resources of the main massifs of the Neva Bay melts was carried out, the value of ecosystems was determined, the results were mapped, and recommendations on the optimal use and protection of the melts were given.

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REFERENCES

1. Zhigul'sky, V.A., Shuisky, V.F., Chebykina, E.Y., Fedorov, V.A., Panichev, V.V., Uspenskiy, A.A., Zhigul'skaya, D.V., Bylina, T.S., Bulysheva, M.M., Bulysheva, A.M. Macrophyte thicket ecosystems of the Neva Bay. Scientific research programme. Results of the 1st stage, St. Petersburg: «Renome», Eco-Express-Service LLC, 2020, 304 p.
2. Noskov, G.A., Rymkevich, T.A., Gaginskaya, A.R., Rychkova, A.L. Migration routes and staging areas of waterfowl in the North-West of Russia and urgent measures for their protection, in Study of population dynamics of migrating birds and trends of their changes in the North-West of Russia, issue 9, St. Petersburg: Tuskarora, 2012, pp. 53–67.

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