Geosistemy perehodnykh zon = Geosystems of Transition Zones / Геосистемы переходных зон
2026, vol. 10, No. 3, p. c. 347–357
http://journal.imgg.ru/archive.htm; https://elibrary.ru/title_about.asp?id=64191
https://doi.org/10.30730/gtrz.2026.10.3.347-357; https://www.elibrary.ru/ewruvq

Seasonal and spatial distribution of chemical pollution of watercourses in an urbanized area with a recreational specialization (using the example of Svetlogorsk, Kaliningrad Region)

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Abstract. Small watercourses of coastal cities with a recreational specialization in the Kaliningrad Region are experiencing significant anthropogenic stress from municipal wastewater and diffuse pollution. However, the seasonal dynamics and spatial distribution of chemical pollution in these resorts have not been sufficiently studied to date. The city of Svetlogorsk has the status of a resort of federal importance, and the quality of its water bodies is an important indicator of the ecological well-being of the area. During 2025–2026, hydrochemical monitoring of two watercourses was carried out at three sampling sites: the Otradnenka stream, the Svetlogorka river upstream and downstream the Tikhoye lake. The results showed that the priority pollutants were ammonium ions, phosphate ions (up to 2.5 times the maximum permissible concentration MPC), chemical oxygen demand (COD), and total iron. Seasonal dynamics were characterized by a summer maximum and a winter minimum. The water pollution index (WPI) ranged from 0.6 to 3.6. The waters of the Otradnenka stream remained either “moderately polluted” or “polluted” throughout the year round. The Svetlogorka river upstream the lake was classified as “clean” in winter but became polluted in summer and autumn. Downstream of the lake, the water quality deteriorated most markedly during the warm seasons.

Keywords:
Kaliningrad Region, urbanized territories, recreation, small watercourses, priority pollutants, water pollution index, seasonal dynamics, spatial variability

For citation: Arkhipov E.A., Zotov S.I., Yakovchuk T.A., Kolyagina M.I. Seasonal and spatial distribution of chemical pollution of watercourses in an urbanized area with a recreational specialization (using the example of Svetlogorsk, Kaliningrad Region). *Geosistemy perehodnykh zon = Geosystems of Transition Zones*, 2026, vol. 10, No. 3, p. 347–357. (In Russ.). https://doi.org/10.30730/gtrz.2026.10.3.347-357; https://www.elibrary.ru/ewruvq

Для цитирования: Архипов Е.А., Зотов С.И., Яковчук Т.А., Колягина М.И. Сезонное и пространственное распределение химического загрязнения водотоков урбанизированной территории с рекреационной специализацией (на примере города Светлогорска Калининградской области). *Геосистемы переходных зон*, 2026, т. 10, № 3, с. 347–357. https://doi.org/10.30730/gtrz.2026.10.3.347-357; https://www.elibrary.ru/ewruvq

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