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«Брестский государственный технический университет»

## **АКТУАЛЬНЫЕ ПРОБЛЕМЫ НАУК О ЗЕМЛЕ ИССЛЕДОВАНИЯ ТРАНСГРАНИЧНЫХ РЕГИОНОВ**

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**TRACES OF THE TRANSBOUNDARY POLLUTION  
OF THE SHORE OF THE SOUTHEASTERN BALTIC  
BY THE DEBRIS OF GEOSYNTHETIC MATERIALS**

Geosynthetic materials such as geotextiles, geogrids, geocells etc. are widely used in the coastal protection constructions at the shore of Kaliningrad Oblast (South-eastern Baltic) [1]. These materials are continuously interacting with seawater, degrade and become a new source of plastic pollution on the beaches. The first monitoring of the entire shore of the Kaliningrad Oblast in 2018 showed its strong contamination with debris of geosynthetic material. The integral assessment of the sizes of debris of geotextile objects were more than 190 m<sup>2</sup>; the integral length of the degraded plastic coating for gabions were about 100 m.

The main purpose of the present study is to analyze the possibility of the trans-boundary pollution of the shores of the Poland and Lithuania by the debris of the geosynthetic material released from deformed or destroyed coastal protection structures of the Kaliningrad Oblast.

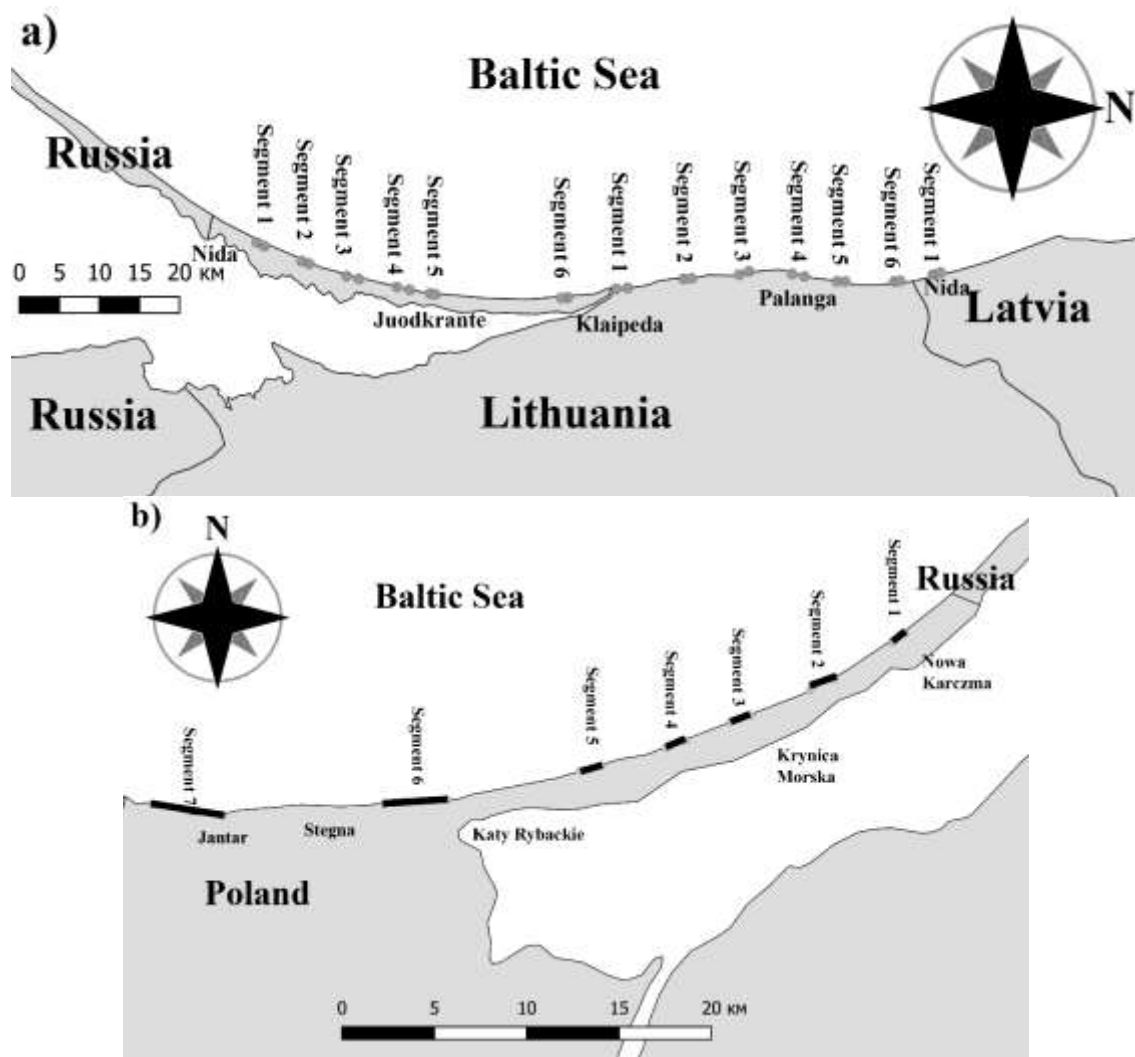
Test field surveys at the Polish and Lithuanian coasts adjacent to Kaliningrad Oblast were made in May-June 2019. There were twelve test 1-km segments at the Lithuanian part of the shore of the Southeastern Baltic (figure a): six 1-km segments on the Lithuanian part of the Curonian Spit (spit sector) and six segments on the mainland to the north towards Latvian-Lithuanian border (mainland sector). Seven test segments of various length were defined at the Polish part of the neighboring shore – five segments on the Polish part of the Vistula Spit and two segments between Vistula river mouth and the core of the Vistula spit (figure b). The method of continuous visual scanning [1] was used.

On the Lithuanian part of the shore the debris of the geosynthetic materials such as geotextiles and coating from gabions, were found at segments 1–5 (Curonian Spit sector) and segments 1, 3, 4 (at the mainland sector). On the Polish part the only degraded plastic coating from gabions were found at segments 6 and 7 near the mouth of the Vistula River.

The primary analysis showed that distribution of the debris of geosynthetic material along the shore of the Southeastern Baltic correlates well with the accepted model of the alongshore sediment transport during the strongest winds for the northern shore of the Kaliningrad Oblast. Debris of geosynthetic material can be transported along the shore from the deformed or destroyed coastal protection structures at the Kaliningrad Oblast to the north till Palanga (Lithuania).

In addition, several pieces of degraded plastic coating from gabions were found on the Russian part of the Vistula Spit. Once there are no gabions at the western shore

of the Sambian Peninsula (Kaliningrad Oblast), the only gabions which are built on the Hel Spit (Poland) may be the source of these degraded plastic coating.



**Figure – Position of the monitoring segments on the Lithuanian (a) and Polish (b) shores**

The result of executed test survey proves the traces of the transboundary pollution of the shore of the southeastern Baltic by the debris of geosynthetic materials. The plastic coating from gabions were used as indicator of this pollution.

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