



Lead Author e-mail: nike137@yandex.ru

Title: *INTEGRATED ECOGEOGRAPHICAL ASSESSMENT OF NATURAL CONDITIONS AND PIPELINE ENGINEERING IN THE COASTAL KARA SEA*

Nikita Kopa-Ovdienko¹

¹*Zubov's State Oceanographic Institute, Russia*

The coastal and shelf regions of the Kara Sea present promising targets for Arctic oil and gas exploration; however, the natural conditions in these regions are still poorly constrained. A thorough understanding of these conditions is essential for planning engineering works and infrastructure. To address this issue, we conducted integrated ecogeographical research in the coastal areas of the Kara Sea in 2005–2012, focusing particularly on the underwater section of the Bovanenkovo–Ukhta gas pipeline, to ensure the stability of both the gas transport infrastructure and the environment. We conducted comprehensive field studies in several key areas: bottom microrelief surveys; investigation of the impact of sea ice on coastal areas; observation of marine environment parameters, coastal zone geomorphology, lithology, and cryogenic structure; measurement of coastal erosion rate; and monitoring of coastal zone profile dynamics. We analyzed the data collected and concluded that coastal erosion and ice gouging are the main threats to gas transport facilities and environmental security in this area. The most vulnerable part of the underwater section of the Bovanenkovo–Ukhta pipeline is the area immediately adjacent to a coastal scarp on the Yugorsky peninsula. Sea ice exerts its most intensive effects on the bottom in the hummocking zone on the edge of the fast ice and in the zone of drift ice near the fast ice edge. The approach adopted here addresses both natural and engineering aspects of the environment, allowing us to ensure geotechnical safety while minimizing environmental impact. The results of this research represent a crucial component in the design of the pipeline.