The research team from the Russian Academy of Sciences proceeded with the comprehensive study of the Taimyr's environmental conditions. The research will help develop recommendations for sustainable business practices to be used by industrial companies in the Russian Arctic. The expedition is organised under the agreement made between the Siberian Branch of the Russian Academy of Sciences and Nornickel in 2020.

Group photo of the Great Norilsk Expedition at a drop zone by Lake Pyasino

The Great Norilsk Expedition 2021 has completed the fieldwork stage of its Taimyr research. Over a span of several months, professionals from 11 scientific organisations of the Siberian Branch of the RAS carefully examined the condition of the peninsula's water bodies and soils. During the three stages of the Expedition's new season, the scientists inspected a total of over 100 locations and collected more than 1,000 samples with an aggregate weight of some 800 kg.

In the course of four months, the researchers used water samples to examine the evolution of hydrocarbon makeup and track changes in its gross share. The detailed study of the impact produced by last year's fuel spill covered all of the affected area's water bodies, including the Bezymyanny (Nadezhdinsky) Stream, Norilskaya, Daldykan and Ambarnaya rivers, Lake Pyasino and Pyasina River, as well as surrounding areas (Melkoye and Lama lakes, Boganida River and the adjacent plateau). In addition, the scientists studied the composition of soils on all floodplain territories and analysed their zoological and biological diversity.

Fish population assessment became one of the key focus areas for this year's Great Norilsk Expedition. The indigenous minorities of the North made a valuable contribution to the research by assisting scientists from the Siberian Branch of the RAS in collecting samples from the northern districts.

We are now proceeding to laboratory testing, with professionals from the Siberian Branch of the RAS in Novosibirsk, Barnaul, Tomsk, Krasnoyarsk, Norilsk and Yakutsk tasked with studying the collected samples using state-of-the-art equipment.

Nikolay Yurkevich, Head of the Ecology Scientific and Research Centre and PhD in Technical Sciences who was in charge of the fieldwork, stressed the importance of laboratory tests: "Earlier, we announced preliminary data on hydrocarbon content in water bodies based on the general on-site instrumental analysis. Maximum permissible concentrations were exceeded at only one location — the Nadezhdinsky (Bezymyanny) Stream. But even there, the concentration overshoots were immaterial as they stayed within the range of thousandths of a gram." According to Mr Yurkevich, laboratory tests made with spectrometer are the only reliable way to find out if the detected hydrocarbon is of natural or anthropogenic origin.

Expedition member collects water sample in Lake Lama

The laboratory tests will also redefine the results of this summer's experiment with microorganisms that degrade hydrocarbons, conducted under the supervision of Yulia Glyaznetsova, PhD in Chemistry, from the Yakutsk Institute of Oil and Gas Problems of the Siberian Branch of the RAS. "The effectiveness of such biologicals was proved as early as in 2020, but those microorganisms did not originate from the Taimyr Peninsula and were not tested on spot," said Nikolay Yurkevich. "This year, however, our colleagues from the Institute reproduced Taimyr microorganisms and used them to create a biological, which was applied to a small area at the Ambarnaya River where rehabilitation after pollution was underway. They also collected soil samples before and after the application (microorganisms are inactive in cold weather). The laboratory research will investigate the extent to which the biological reduces hydrocarbon content and compare it with the results of conventional mechanical rehabilitation."

"With increasing consistency, Nornickel acts as a responsible user of natural resources and conducts profound studies in the regions where it operates," commented Academician Valentin Parmon, Chairman of the Siberian Branch of the Russian Academy of Sciences and Supervisor of the Great Norilsk Expedition. "In line with the Company's Biodiversity Policy, the Siberian Branch of the RAS has developed a comprehensive baseline study programme and defined the areas of impact of the Group's various facilities. The Company makes a significant contribution to the activities of the Siberian Branch. This well-established cooperation with academic institutions possessing top research competencies and vast experience in combining them can serve as an example for all major natural resource users in Russia."

In the near future, the Siberian Branch of the RAS and Nornickel will enter into a new cooperation agreement providing for comprehensive field and laboratory studies of biodiversity in the Arctic, including the Taimyr and supporting points along the Northern Sea Route, and in the Trans-Baikal Territory.

"Synergies between business and science are key to successful research of the legacy and future potential of Russia's Arctic. The aggregate results of the Great Norilsk Expedition give us the big picture of the region's current condition and allow us to identify the most efficient tools,

methods, and solutions for the ecosystem rehabilitation and rethinking of the existing approach to the industrial development of the area," said Andrey Grachev, Vice President for Federal and Regional Programmes at Nornickel.

According to the scientists, the report of the Great Norilsk Expedition, including the results of field and laboratory studies, will be finalised by the end of this year and presented to all stakeholders.

30 September 2021