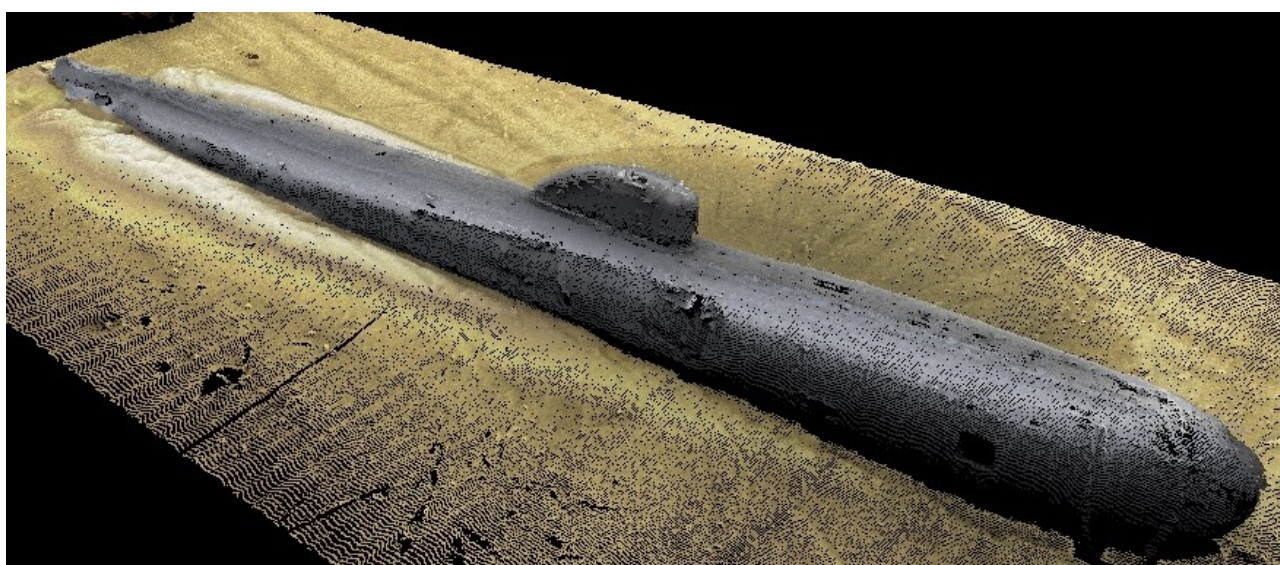




## No leakage from the sunken nuclear submarine K-159

In 2014 a joint Norwegian Russian expedition visited the site of the sunken nuclear submarine K-159 in the Barents Sea. No indication of any leakage from the reactor units of K-159 to the marine environment was detected. Due to the potential for contamination, further monitoring of the submarine is warranted.



Sonar image of K-159 from 2007 (Photo: ADUS DeepOcean and Salvage & Marine Operations (S&MO) of the UK MOD)

### A source of radioactive contamination?

In August 2003 the decommissioned nuclear submarine K-159 sank to a depth of 246 m at the entrance of Kola Bay whilst under tow to a shipyard for the final defueling of its reactors and dismantling. K-159 sank with around 800 kg of spent nuclear fuel within its reactors. At the time of the joint Norwegian Russian expedition in 2014, the total radioactive inventory of K-159 was estimated at 2.6 PBq, with greater than 90% of the remaining activity due to Sr-90 and Cs-137.

Russian monitoring carried out between 2003 and 2007 concluded that no leakages from the reactors of K-159 to the marine environment had occurred.

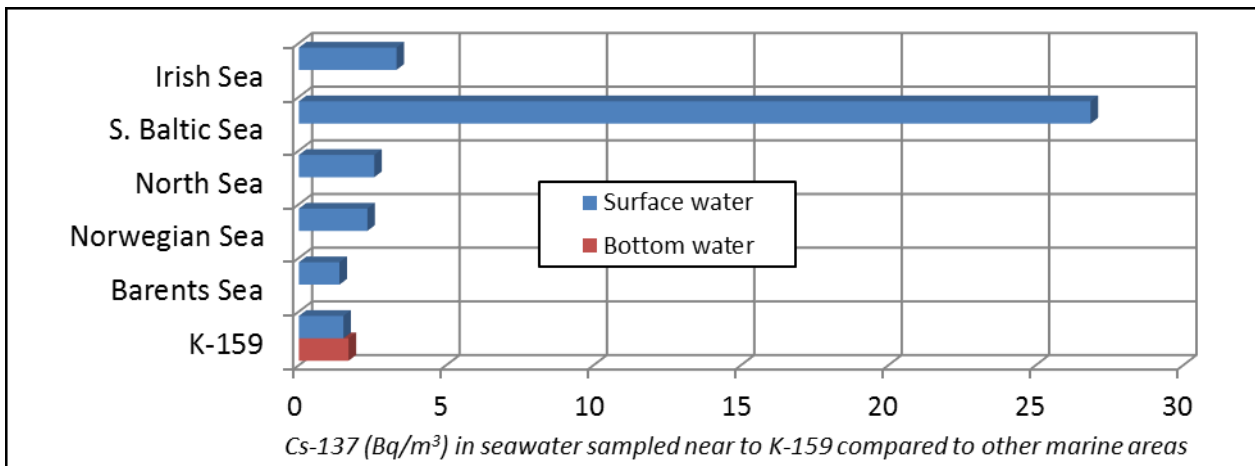
K-159 lies less than 130 km from the border with Norway and in proximity to important Norwegian and Russian fishing grounds in the Barents Sea.

### No leakage detected

In 2014, the nuclear submarine K-159 was found lying upright on the seafloor at the entrance to Kola Bay. The inspection of the outer hull showed that a number of hatches were missing and that areas of the forward and stern deck were damaged. A break in the hull near the stern of the submarine could be observed.

There was no indication of any leakage from the reactor units of K-159 to the marine environment, based on results of the measurements and analyses carried out on samples taken close to and in the area around the submarine,

Comparison of the results of the analyses of seawater and sediment samples with data from other marine areas suggests that the main sources



of radionuclides to the area around K-159 are long-range ocean transport from sources further afield and global fallout.

Activity concentrations of Cs-137 in fish from the sampling area were low and comparable to reported values for the Norwegian Sea and Barents Sea.



*Damage to the outer hull of K-159 close to stern*

### A need for further monitoring

Due to potential risk of radioactive contamination further monitoring of the situation and status of K-159 is warranted. It is clear that K-159 has suffered further damage to its outer hull when or since it sank in 2003, including a break in the outer hull close to the stern. It was not possible during the joint expedition in 2014 to determine whether the sinking and impact on the seafloor has had any effect on the inner pressure hull of K-159. Monitoring of the marine environment around K-159 should be followed closely, especially in connection with any plans for the recovery of the submarine.

### Organisation of the expedition

The expedition to K-159 was organised through the Norwegian-Russian expert group as one aspect of the greater cooperation between Norway and Russia with regard to nuclear safety and radiological environmental assessments.

The expedition was organized and carried out by the Norwegian Radiation Protection Authority, the Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet) and the Institute of Marine Research, in conjunction with the Research and Production Association "Typhoon", the Norwegian University of Life Sciences, the National Research Centre "Kurchatov Institute" and the IAEA.

The expedition was funded through the Norwegian Government's Nuclear Action Plan with allocations from the Norwegian Ministry of Foreign Affairs and administered by the Norwegian Radiation Protection Authority.

### Further reading

The full joint expedition report as well as a report on the radiological impact of hypothetical accident scenarios involving K-159 are available from the NRPA's website.

- 1) [Joint Norwegian Russian expedition report](#)
- 2) [Impact assessment for hypothetical accident scenarios involving K-159](#)