

Science for Environment Policy

European coastal regions at greatest risk from oil spills identified by new risk index

European Atlantic countries are, in general, at higher risk of being affected by oil spills than Mediterranean and Baltic countries, with the United Kingdom most affected, according to new research. The study developed a new risk index for analysing the potential vulnerability of coastal regions to oil spills at sea.

Oil spills at sea can be devastating events. Not only does oil pollution harm [marine wildlife](#), it can also affect coastal communities by causing fishing and recreational activities to close. To help marine policymakers, this study has proposed a method to measure and compare the risk to European coastal regions from oil spills at sea.

The method uses computer modelling to simulate the effect of an oil spill at sea along a stretch of European coastline. The modelling considers the distance to the coast from the spill, the size of the spill, the shape and length of the proportion of the coast that would be affected and the direction and speed of the ocean currents at the time of the accident. It also drew on data from actual accidental oil spills that occurred in European waters from 1970 to 2014.

This led to a marine spill risk index, which ranks each NUTS3 ([Nomenclature of Territorial Units for Statistics](#)) region according to the risk of an oil spill at sea affecting the region. The NUTS3 divides all European countries into smaller regions; 429 of these regions in 28 European coastal countries were covered by this study. This relative risk was also illustrated in a map to identify the range of risk that different coastal territories in European waters may face from a marine spill.

The index revealed that the west coast of the UK was at highest risk of being affected by an oil spill at sea. Of the 25 regions most at risk from an oil spill, 20 were along the UK coast and the top three were all in the UK — Torbay, Swansea and Blackpool. Of the remaining five regions, four were in Greece (Argolida, Arkadia, Korinthia and Voiotia) and one was a Spanish region (Ceuta), on the north coast of Africa.

The UK's west coast is the area with the highest risk partly as a result of ocean currents that push oil towards the coast. In general, though, sea currents tend to disperse oil away from the coastal areas in Europe.

At the country level, countries on the Atlantic European coast, including, (in order of risk) the UK, Germany, Netherlands, France, Spain and Portugal, had the highest risks from oil spills. However, the Mediterranean countries of Greece, Italy, and Turkey were also among those at the most risk.

In contrast, countries including Poland, Cyprus, Albania, Lithuania and Montenegro, located around the Mediterranean and Baltic seas, had comparatively lower risks from oil spills. Iceland had the lowest risk of all the countries, despite its Atlantic location. The study suggests that, as major international and coastal shipping routes tend to be close to the shore along the European Atlantic coastline, these regions tend to have a greater marine spill risk — compared with regions in the other European seas, such as Baltic and Mediterranean waters.

The researcher suggests that some extensions to the index, such as inclusion of more complex dispersal effects i.e. the effect of dispersion of oil due to ocean currents, in addition to the spreading of oil spills, could be considered in future research.

This study could help policymakers manage risks in coastal areas by identifying regions which are the most vulnerable to the impact of an oil spill at sea, and inform protective measures against potential future spills.



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