

**Towards quantitative oil spill risk assessment in the Arctic sea areas**

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The probability of a major oil accident in Arctic marine areas is increasing alongside with increasing maritime traffic. Hence, there is an obvious need to develop analysis tools that offer a systematic way to assess the ecological consequences of oil spills so that the oil induced risks can be taken into account when new sea routes or previously unexploited oil reserves are utilized. So far these risks have mainly been acknowledged in terms of qualitative descriptions, but we aim to move towards more quantitative oil risk assessment. We do so by building a probabilistic framework to analyze ecological impacts of oil spills in the Arctic marine environment. Our work rests on a general food web approach which is based on key functional groups. We argue that this approach is more appropriate for providing holistic view of the involved risks than assessments based on single species. This holds true especially when species data is scarce or totally lacking, as is often the case in the Arctic. We underline the issues that are characteristic to the Arctic and thus need a special attention in risk assessment, discuss the current knowledge gaps, and provide examples how to proceed towards quantitative risk estimates. The conceptual model presented helps to identify the most important risks to Arctic environment and can be used as a template for more detailed risk assessments.

**Keywords:** Arctic, oil spill, food web, functional groups, uncertainty, risk assessment

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