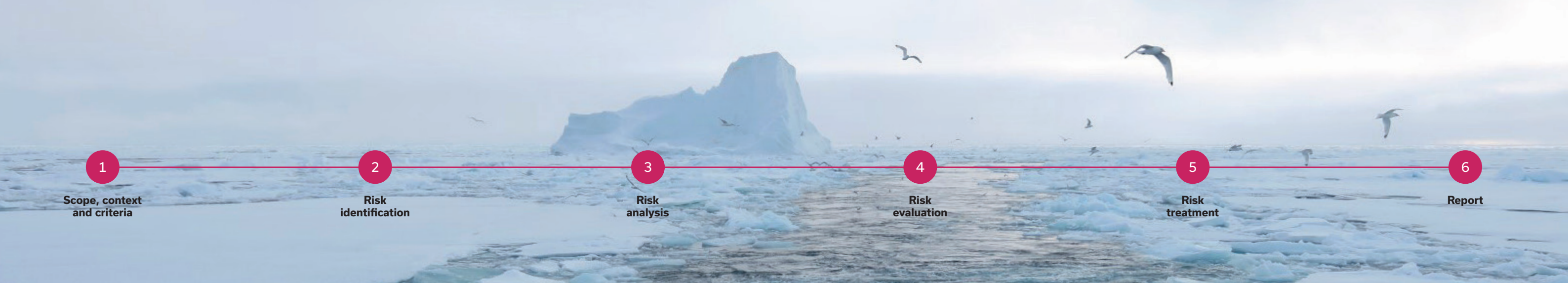


GUIDELINE

Arctic Marine Risk Assessment

Best practice methods and data sources for conducting regional and area-wide risk assessments concerned with ship traffic and operations in Arctic.





↑ **Figure 1:** The Guideline applies the risk management process as defined in ISO 31000:2018

The six steps of risk management

Background

As a follow-up to the Arctic Council Framework Plan for Oil Pollution Prevention (2015), the Arctic Council Working Group Emergency Prevention, Preparedness and Response (EPPR) identified the need for a common approach to marine risk assessments in the Arctic region.

Risk assessments are fundamental for the selection and prioritization of risk reducing measures for safety and emergency preparedness. However, most of the existing risk analysis methods and tools that are applied world-wide today do not sufficiently address Arctic conditions (harsh weather, remoteness etc.).

Objective

The Guideline aims to:

- Engage Arctic stakeholders to agree on best practice methods and data sources, and make these readily available
- Better understand, communicate and incorporate specific Arctic risk influencing factors (ARIFs) into the risk assessment process

The approach includes mapping of sensitive areas and period of the year, and a damage assessment for different spill types. Sometimes, the approach includes spill modelling in order to better account for the fate and trajectory of potential spills.

Users

Intended users of the Guideline are stakeholders involved with, or responsible for, optimization of risk management strategies concerning prevention and preparedness for loss of life and acute environmental damage in the Arctic region, e.g.:

- Governments and administrations that have the authority to implement prevention and preparedness measures

- IGOs and NGOs (e.g. Arctic Council)
- Consultants and others (e.g. non-governmental organizations) that support governments and administrations

Although the Guideline is not intended for voyage planning purposes, ship owners and operators may use elements of the Guideline to obtain information about Arctic risk factors and data sources

Application

The Guideline targets methods and data sources used for 1) marine risk assessments, which are also referred to as navigational-, shipping- or ship traffic risk assessments and; 2) environmental risk assessment of the ship traffic in Arctic waters. Further, it describes how Arctic risk influencing factors affect incident probabilities and consequences.

Marine risk assessment evaluates marine hazards such as; ship grounding, collision, contact, fire/explosion and foundering. Risk is assessed by first predicting the likelihood of hazardous events and then the potential severity of the consequences for people and spills to marine environment.

The environmental risk assessment objective is to assess the potential ecological and sometimes socio-economic consequences of spills from ships by considering the sensitivity of different types of environments to spill-related damage.

A project was initiated to develop a Guideline that points to best practice methods, tools and data to support regional adaptations of risk assessments to reflect Arctic risk influencing factors (ARIFs).

Process

The project was initiated in 2017 by the Norwegian Coastal Administration (NCA) on behalf of EPPR, and project management was contracted to DNV GL.

The work has been following a stepwise approach, starting with a scoping workshop and followed by screening of methodologies, tools and data relevant for the Guideline. A prototype of the user interface has been developed and Tested. And finally, a web-based solution was implemented. Stakeholder involvement has been maintained by regular workshops and webinars.

Guideline content

The Guideline applies the risk management process as defined in ISO 31000:2018. The Guideline uses the six steps of risk management process (Figure 1) with some customization to fit the objective of capturing the Arctic risk influencing factors (ARIFs). Some of the key content in the Guideline:

Risk Identification:

- Links to descriptions of different hazard identification techniques
- Cause and effect diagram describing how ARIFs may influence different types of accidents and consequences of accidents
- Causal networks to visualize how ARIFs may influence human and technical performance in Arctic conditions (underlying causes to marine accidents)











Risk Analysis:

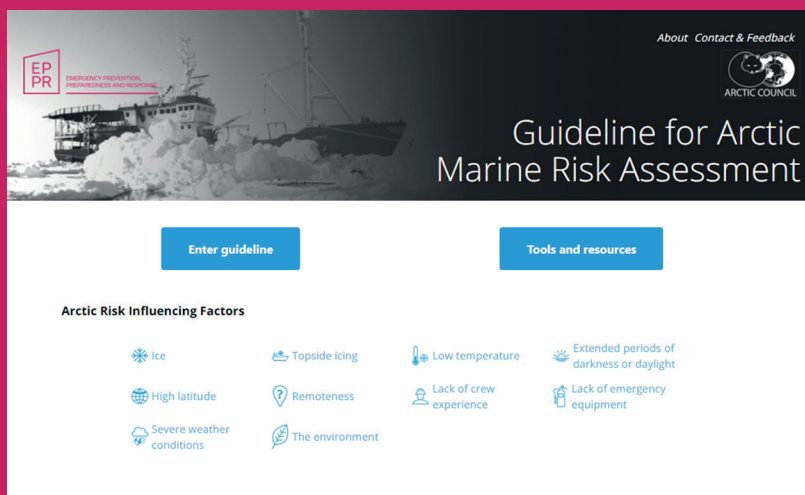
- Description of best practice quantitative marine risk calculation methods and tools
- Best practice methods and tools that quantify the influence of ARIFs
- Best practices for marine environmental risk assessment in the Arctic

Tools and resources:

- Comprehensive list of methods and tools for marine and environmental risk assessment for Arctic
- Links to meteorological and oceanographic (metocean) data

The following factors are defined and broken down as Arctic risk influencing factors (ARIFs) in this Guideline (ref. IMO Polar Code sources of hazards)

-  Sea ice
-  Topside icing
-  Low temperature
-  Extended periods of darkness or daylight
-  High latitude
-  Remoteness
-  Potential lack of ship crew experience in polar operations
-  Potential lack of suitable emergency response equipment
-  Rapidly changing and severe weather conditions
-  Sensitivity of environment



Guideline for Arctic
Marine Risk Assessment:
<https://epr.dnvgl.com>

Contributors

The project is an Arctic Council EPPR project, and is financed by Norway. The Norwegian Coastal Administration has had the lead on the project, and DNV GL has been contracted as consultants.



Arctic Council is the leading intergovernmental forum promoting cooperation, coordination and interaction among the Arctic States, Arctic indigenous communities and other Arctic inhabitants on common Arctic issues, in particular on issues of sustainable development and environmental protection in the Arctic. The Ottawa Declaration lists the following countries as Members of the Arctic Council: Canada, the Kingdom of Denmark, Finland, Iceland, Norway, the Russian Federation, Sweden and the United States.

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EPPR is one of six working groups of the Arctic Council and is mandated to contribute to the prevention, preparedness and response to environmental and other emergencies, accidents, and Search and Rescue. While not an operational response organization, EPPR conducts projects to address gaps, prepare strategies, share information, collect data, and collaborate with relevant partners on capabilities and research needs that exist in the Arctic.

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The Norwegian Coastal Administration (NCA) is an agency of the Norwegian Ministry of Transport and Communications responsible for services related to maritime safety, maritime infrastructure, transport planning and efficiency, and emergency response to acute pollution. The main objective of the NCA is to ensure safe and efficient navigation in the fairways along the coast and into ports, as well as national preparedness for acute pollution.

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Photos Frontpage: Trawler Northguider capsized in ice in the Strait of Hinlopen, Svalbard archipelago. Photo by The Governor of Svalbard. Display: Sparreneset, Hinlopenstredet, Svalbard. Photo by Andreas Kjøl, Norwegian Coastal Administration.