

# IMPACTS OF CLIMATE CHANGE ON SHIPPING

## MCCIP

### Executive Summary

The UK relies heavily on trade by sea. This trade will potentially be affected by climate change in two ways, firstly by the effects on UK ports and secondly by effects on ships when in transit.

Analysis of the likely impact on UK ports shows that climate change impacts will be very site specific, depending on the port location, layout and orientation with respect to prevailing weather conditions. The major risks are perceived to be due to flooding and physical damage which are associated with sea level rise and storminess. The low confidence levels associated with predicted future wind speeds is a significant issue due to the importance of storm surges within the forecast impacts.

Shipping routinely uses up-to-date forecasts for route selection, and the internationally certified load lines for ships are region, and hence prevailing weather and wave climate dependent. Consequently, the likely increased 'storminess' aspects of climate change will lead to:

- (i) reduced carrying capacity and/or route changes and/or slower speeds (with likely increased fuel consumption and transport costs)
- (ii) restrictions on the [operational envelopes](#) for some ships (for example, aluminium fast-ferries are particularly prone to fatigue damage from larger waves)
- (iii) increased difficulties in manoeuvring in ports and other restricted waterways.

Significant sea-level rise will also make ships more vulnerable to damage against existing non-floating berthing facilities.

Observations over the past 50 years have indicated a marked decline in the extent of Arctic sea ice. By 2080 it has been predicted that the navigation season for the Northern Sea Route (NSR) from Eurasia to the Bering Sea will increase from the current 20-30 days per year to 90-100 days by 2080. Opening of shipping routes and extending the navigation season will significantly reduce transport distances from Europe to Asia (compared to southerly routes) and opening access to natural resources. This could also potentially lead to increased environmental degradation and impacts from oil spills, which are suggested to be worse at higher latitudes than low latitudes. Increased sea ice variability in the Northwest passage (north of Canada) could make shipping routes here more hazardous, with more icebergs and increased fog.

### Level of Confidence

Low

### Key sources of Information

Pinnegar, J.K., Viner D., Hadley D., Dye S., Harris M., Berkhout F. and Simpson M. (2006). Alternative future scenarios for marine ecosystems (AFMEC). Technical Report. CEFAS, Lowestoft 109pp

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