

## OUR VIEW

Danish Shipping supports IMO guidelines on biofouling management and promotes monitoring and regular hull cleaning, using eco-friendly methods to reduce fouling and biosecurity risks and to ensure that records of activities are kept providing proof of adherence to the guideline.

Danish Shipping advocates for the use of non-toxic, long-lasting coatings that reduce maintenance and environmental impact in line with the IMO's AFS Convention.

Danish Shipping encourages new technologies like robotic hull cleaning and real-time biofouling monitoring to boost efficiency and reduce ecological impacts.

Photo left:  
Barnacles

Photo right:  
Heavy macrofouling

# Biofouling Management

**Biofouling management is critical for reducing the risk of moving invasive aquatic species into vulnerable marine ecosystems and contributes to the protection of marine biodiversity and the ecological balance of oceanic environments.**

## IMO Guidelines for Biofouling Control

The International Maritime Organization (IMO) has developed a comprehensive guideline on management of biofouling (the 2023 Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species). This IMO guideline promotes the adoption of standardized operational procedures to reduce biofouling risks.

The guideline also emphasizes the necessity of preventing biofouling growth through systematic hull cleaning measures to minimize the colonization of fouling organisms on submerged surfaces, thus reducing hydrodynamic drag and the biosecurity risks.

Moreover, the guideline promotes the use of state-of-the-art, non-toxic, and biocide-free anti-fouling coatings, including silicone-based foul-release coatings. These coatings are engineered for

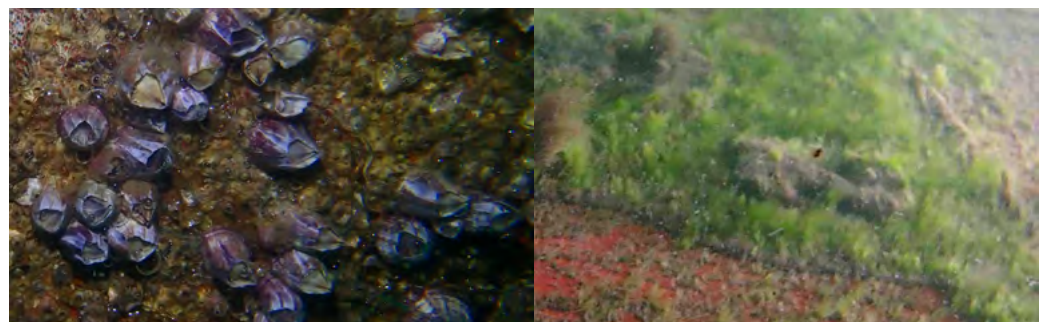
durability and high performance, thereby decreasing the frequency of maintenance cycles and the environmental consequences of hull biofouling.

Compliance with biofouling management guideline is ensured through monitoring and documentation of hull inspection schedules, biofouling assessments, and the application of anti-fouling treatments.

To further optimize biofouling management, it is recommended to utilize innovative technologies such as hydrodynamic hull designs optimized for reduced fouling, autonomous robotic hull-cleaning systems, and advanced sensor technologies for real-time monitoring of biofouling accumulation. These technological advancements also increase operational efficiency, reduce maintenance downtime, and contribute to the sustainable operation of ships.

## FACTS

- Biofouling is a major factor in the spread of invasive species. A study has shown that this vector has the same impact as that of ballast water prior to implementation of the ballast water convention.<sup>1</sup>
- Biofouling on the hull reduces a vessel's fuel efficiency. Even a small amount of fouling (like algae or barnacles) can increase drag by up to 55%, leading to a considerable rise in fuel consumption.<sup>2</sup>
- To reduce biofouling, some ships now use underwater robots that can autonomously clean the hull. These devices use brushes or water jets to remove organisms before they become a major problem, reducing the need for dry-docking or manual cleaning.



<sup>1</sup> Hewitt CL & Campbell ML 2010. *The relative contribution of vectors to the introduction and transportation of invasive marine species*, Department of Agriculture, Fisheries and Forestry, Australia.

<sup>2</sup> *Impact of Ships' Biofouling on Greenhouse Gas Emissions*, by GloFouling and IMO, 2022.