

## Introduction of non-indigenous species

Ballast water is essential to the safe and efficient operation of shipping, providing balance and stability to ships. Exchange of ballast water does however pose a risk to marine ecosystems as it includes marine species which can be introduced when releasing ballast water in other parts of the world. Non-indigenous species also travel through other vectors such as fouling on ships hulls and sea chests.

### ***What is the problem?***

Over 160 non-indigenous species have been identified in the OSPAR regions. However, introductions of non-indigenous species are by nature very difficult to pinpoint in time. It is difficult to get reliable and timely information of spatial distribution of any such species since this implies a host of infrastructure. Furthermore impacts of invasions are in general very difficult to assess. As a result of these difficulties the number of species in the OSPAR maritime area is certainly under represented.

Some of the main routes of such unintentional introductions are ship's ballast water and associated sediments as well as fouling on ships' hulls (ICES, 2009). Species invasions are related to the volume of ballast water discharged, the frequency of ship visits and the environmental match of the donor and recipient region of the ballast water (Figure 4.5).

Non-indigenous species can severely affect the structure of the ecosystem. Ballast water has been named as the main vector for a number of species (ICES, 2009). For example, the zooplankton and fish-egg feeding comb jellyfish which has been introduced with ballast water to the Black Sea in the 1980s and has been associated with dramatic changes in the pelagic system of the Black Sea with effects throughout the food chain and with collapse of commercial anchovy fisheries (DAISIE, 2006 with further references). The species (see photo) was first recorded in the Netherlands, Norway and Sweden (Region II) in 2006. Its effects on the North Sea trophic structure and fish stocks such as cod are still unknown. Milder winters due to sea temperature rise are expected to favour its spreading in the Region.

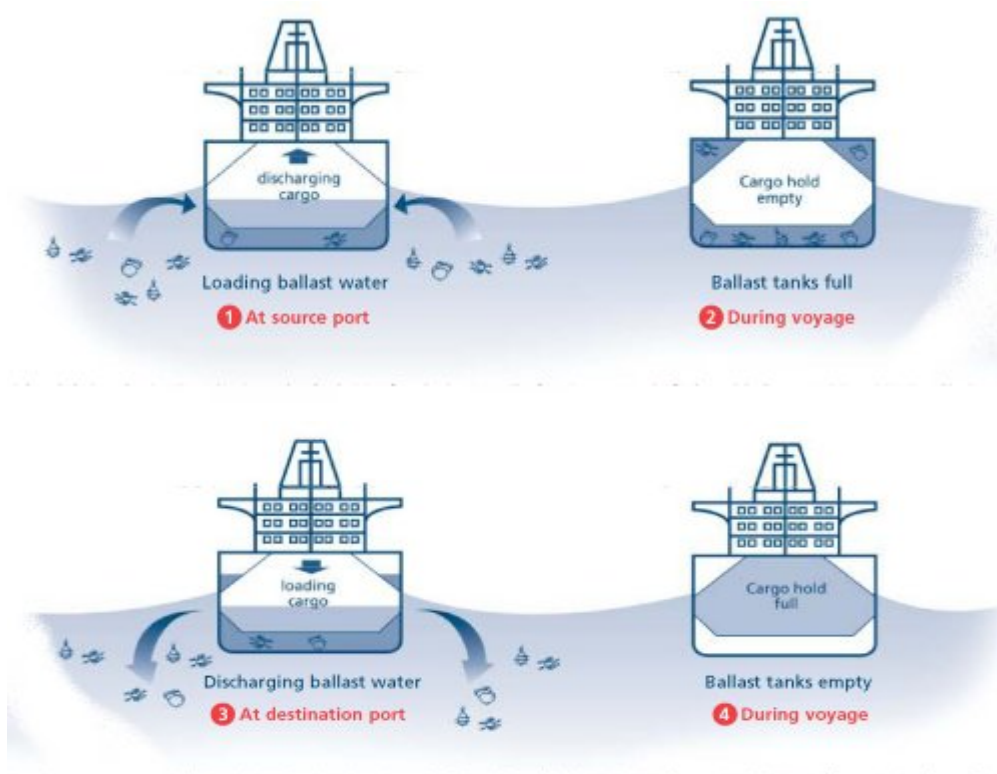


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Shipping traffic is increasing, therefore the probability of the introduction of new species is also increasing. Additionally, faster ships and shorter voyage times means that organisms have a greater chance of survival during the voyage. Temperature rise due to climate change might favour living conditions and distribution of certain invasive species.

### ***What has been done?***

International legislation has been adopted through the IMO to control the management of ballast water and reduce the transfer of non indigenous species. The Contracting Parties of OSPAR and HELCOM have developed guidelines for the management of ballast water based on those of the IMO which can be used on a voluntary basis during the interim period. For details on measures see Table 3.1.



### Representative Ballast Capacities

VESSEL TYPE	DWT	BALLAST CONDITION			
		NORMAL (tonnes)	% of DWT	HEAVY (tonnes)	% of DWT
Bulk carrier	250 000	75 000	30	113 000	45
Bulk carrier	150 000	45 000	30	67 000	45
Bulk carrier	70 000	25 000	36	40 000	57
Bulk carrier	35 000	10 000	30	17 000	49
Tanker	100 000	40 000	40	45 000	45
Tanker	40 000	12 000	30	15 000	38
Container	40,000	12 000	30	15 000	38
Container	15 000	5000	30	n/a	
General cargo	17 000	6000	35	n/a	
General cargo	8000	3000	38	n/a	
Passenger/RORO	3000	1000	33	n/a	

**Figure 4.5** Cross section of ships showing ballast tanks and ballast water cycle. Ballast water capacity is given in dead weight tonnes. Source: AGPS, 1993.

***Did it work?***

Whilst the introduction of non-indigenous species is evident it is very difficult to identify and assess the impact of the introduction of non-indigenous species particularly in linking a species invasion to a single voyage or shipping operation. Qualitative data on the status of introductions of Non-indigenous Marine Species to the North Atlantic and Adjacent Waters for the period 1992 to 2002 was elaborated by the International Council for the Exploration of the Sea Working Group on Introductions and Transfers of Marine Organism and was presented in the 2006 annual report of ICES. There is a need for better inventories and more strategically targeted studies and specific methodologies to identify rare species and unique habitats in order to determine which species are indigenous/non-indigenous to each Contracting Party.

***What lessons have we learnt since 1998?***

It is not possible to provide information relating to species abundance as data is limited. In addition it has been recognised that the number of non-indigenous species in the Region is under-represented as long-term monitoring and recoding of data is not available. As identification techniques become more sophisticated, it is likely that the list of non-indigenous species will increase.

↪ *Go to full QSR assessment report on the impact of shipping on the marine environment (publication number 440/2009)*