SciDoc Publishers
Infer, Interpret & Inspire Science

International Journal of Marine Science and Ocean Technology (IJMO)
ISSN: 2577-4395

Are we at Last Ready to Begin Controlling the Global Spread of Aquatic Invasives?

Editorial

Fileman T, Vance T, de Mora S*

PML Applications Ltd, Plymouth Marine Laboratory, Prospect Place, Plymouth PL1 3DH, United Kingdom.

The question really should be: are we really serious about controlling the global spread of aquatic invasives? Given that it has so far taken over 11 years to even get close to ratifying the International Maritime Organisation (IMO) Ballast Water Convention, the answer has to be 'not really'! Coupled with this, we are also aware that another significant vector of transport for aquatic invasives is hull fouling on ships, which is currently unregulated on a global scale.

According to the UN Conference on Trade and Development 2014 review of maritime transport, about 80% by volume (70% by value) of world trade is carried by sea utilising over 50,000 ships with a combined tonnage of around 600 million gross tonnes [2]. As all these ships travel the oceans, they carry with them non-native species and microorganisms via their hull fouling and also in the ballast water that they utilise to ensure stability. Each ship may carry 7 to 10 thousand different species (including microbes) and ships distribute an estimated 3 to 5 billion tonnes (3 to 5 km^3) of ballast water globally each year [1]. Some of these organisms have the potential to be pathogenic, cause harm, disrupt ecosystems and threaten biodiversity. There is already an average of over 10 marine alien species found per marina or port on the south coast of England [3]. While the annual costs of invasions by aquatic aliens are not just financial, in the USA they are estimated to cost about $137 billion and in the UK about £1.7 billion [4]. These sums are likely to be significantly less than the full economic cost since many indirect costs resulting from invasive non-native species, such as the damage to ecosystem services and loss of biodiversity, cannot be readily quantified, or may remain undetected.

The problem is not new however. Darwin noticed alien species introductions as far back as 1854 when he suggested that barnacles were being transported on ships hulls from the Pacific to the Mediterranean [5]. About 116 years later (1970), the introduction of alien species in ballast water was defined as a problem by the IMO. Another 18 years later (1988) came the first reports by Canada to the IMO of harmful effects from unwanted species in the Great Lakes caused by ship's ballast water. This was followed in 1991 by the adoption by the IMO Marine Environment Protection Committee (MEPC) of the first voluntary ballast water guidelines that were reviewed in 1992 at the Rio Summit. A keyoutcome was that invasive species were identified as one of the four greatest threats to the world ocean, and the following year (1993) ballast water guidelines were adopted as an IMO Assembly Resolution. In 1997, these guidelines were superseded by improved guidelines and a resolution requesting governments to act in applying them. To that end, in 1999 the IMO Ballast Water Working Group began preparation of the free-standing Convention that was adopted in 2004. The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention) is aimed at reducing and eventually eliminating the risks from discharge of harmful aquatic organisms and pathogens in ship's ballast water. It can only enter into force 12 months after signing by at least 30 states representing 35% gross tonnage of world's shipping. After over 11 years, we still have not reached this target. The current position (as of 18 Jan 2016) is that 47 countries (more than enough) have now signed but representing only 34.56% gross tonnage. Thus, the Convention still requires signing by more countries representing a further 0.44% before it can come into force.

The BWM Convention imposes a challenging ballast water performance standard both to treat and to measure. Much debate has been had over definitions of live versus viable, and the acceptable versus unacceptable risks. Reliable detection methods that meet the required standards are still being developed and debated. In response to the Convention, a number of technologies have been turned into treatment systems for ships, type approved and commercialised creating a multi-billion dollar industry. Although in the rush to win market share, there is much misinformation, with claims and counter-claims between equipment manufacturers, regulators and vessel operators. Of particular note is the matter of regrowth of microbes in ballast tanks following an initial treatment from a ballast water treatment (BWT) system. Practical experience to date suggests this could be

***Corresponding Author**:
Stephen de Mora
PML Applications Ltd, Plymouth Marine Laboratory, Prospect Place, Plymouth PL1 3DH, United Kingdom.
E-mail: sjdm@pml.ac.uk

Received: March 11, 2016
Published: March 21, 2016

Citation: Fileman T, Vance T, de Mora S (2016) Are we at Last Ready to Begin Controlling the Global Spread of Aquatic Invasives?. *Int J Marine Sci Ocean Technol.* 3(2e), 1-2.
doi: http://dx.doi.org/10.19070/2577-4395-160004e

an emerging problem for many types of BWT system. However, as with any fledgling technology, it is likely that attention and possible modification will be required following extended use of the first generation of BWT systems on board vessels. From an environmental perspective, the most rapid way to reduce the environmental risk from ballast water is to ratify the BWM Convention, fit and operate BWT technology and develop practical experience without fear of prosecution during this pioneering stage. This approach would enable the industry as a whole to advance their understanding of the technical requirements of treating large volumes of ballast water and take practical steps towards reducing the translocation of aquatic organisms. But, thus far, very few ships have fitted systems, and of those, many are not being used. Few ports and Port States are prepared and with many thousands of ships still requiring treatment systems to be fitted it seems that even when the Convention is finally in force after so many years, it could be many more before the serious risks from this mass distribution of organisms are finally under control. Then there is the other half of the problem, biofouling, which has yet to be regulated in a unified fashion. Clearly, in terms of ballast water treatment and biofouling, there is a requirement for research, development and perhaps a shift in priorities required before we can truly begin to bring this serious issue under some kind of control.

References

[1]. Carlton JT (1999) Scale and ecological consequences of biological invasions in the world's oceans. In Invasive species and biodiversity management. Kluwer Academic Publishers, Dordrecht, The Netherlands. 195-212.

[2]. Review of Maritime Transport 2014. United Nations Conference on Trade and Development United Nations Publication.

[3]. Bishop JDD, Wood CA, Yunnie ALE, Griffiths CA (2015) Unheralded arrivals: non-native sessile invertebrates in marinas on the English coast. Aquatic Invasions 10(3): 249-264.

[4]. Williams F, Eschen R, Harris A, Djeddour D, Pratt C, et al. (2010) The Economic Cost of Invasive Non-Native Species on Great Britain.

[5]. Bishop MWH (1951) Distribution of barnacles by ships. Nature 167: 531.