1-2013

Current legal developments China: Prevention of invasive species from ballast water in China

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MARTINUS NIJHOFF PUBLISHERS

The International Journal of Marine and Coastal Law 28 (2013) 171–187

THE INTERNATIONAL JOURNAL OF MARINE AND COASTAL LAW

brill.com/estu

Current Legal Developments China

Prevention of Invasive Species from Ballast Water

Introduction: The Emerging International Law and Challenges for China

The introduction of invasive marine species by ships is one of the four most significant threats to the world's oceans.[1] Global shipping moves over 80% of the world's commodities and transfers approximately 3 to 5 billion tonnes of ballast water each year.[2] Every day about 3,000 species of animals and plants are transported around the world in the ballast water of ships, or on their hulls.[3] Some invasive alien marine species can have serious ecological as well as social and economic impacts.[4]

Marine invasive species present a particular concern for China. It is a coastal state with 18,000 km of mainland coastline and more than 6,900 islands. The total sea area claimed under China's jurisdiction is approximately 3,000,000 km^2. This includes the Bohai Sea, and areas in the Yellow Sea, the East China Sea and South China Sea. These sea areas stretch across three climatic zones, namely, the warm temperate zone, sub-tropical zone and tropical zone. China's sea areas also contain abundant marine biodiversity, with 22,629 recorded species, and various types of marine ecosystems, such as mangroves, coral reefs, coastal wetlands, sea grass beds, islands, bays, estuaries

[1] The other three are: land-based sources of marine pollution, overexploitation of living marine resources and physical alteration/destruction of marine habitat <globallast.imo.org/index.asp?page=problem.htm&menu=true> accessed 17 Oct. 2012.

[2] *Ibid.*

[3] Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), "A Sea of Troubles", Report and Studies GESAMP No.70 (2001) 13.

[4] N Bax, A Williamson, M Aguero, E Gonzalez and W Geeves, 'Marine Invasive Alien Species: a Threat to Global Biodiversity' (2003) 27 *Marine Policy* 314–315.

DOI: 10.1163/15718085-12341269

and upwellings.[5] In China, invasive species have already caused negative environmental, economic and human health impacts. Invasive species such as Zebra Mussels have been introduced by ballast water and are growing very fast in the coastal provinces of Fujian, Hainan, Guangdong and Guangxi. These invasive species compete with indigenous species for resources and result in a reduction in biological diversity. Furthermore, recent increases in red tides have been attributed in part to invasive algae from ballast water. At least 16 species of invasive red-tide-causing algae have been identified in sea areas under China's jurisdiction as being introduced by ballast water.[6] There were 69 red-tide outbreaks in China's sea areas in 2010. This resulted in the pollution of 10,892 km^2 of China's sea areas.[7]

Invasive species have also had a negative economic impact. Chinese fisheries, tourism and aquaculture have been seriously affected in recent years. In 2005, the direct economic loss to aquaculture as a result of red tides was 69 million Renminbi.[8] Invasive species introduced into the marine environment by ballast water include toxic algae which can enter the human food chain and cause harm to human health.[9] In spite of these threats and impacts, the issue of ballast-water-introduced invasive species only received official recognition in the 2006 State Oceanic Administration (SOA) National Report on the Quality of the Marine Environment.[10]

This paper examines the practice, problems and prospects of preventing invasive species from ballast water in China. It first outlines the international legal regime for ballast water management. Of particular concern is the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004 (BWM Convention), the principal legal instrument designed to regulate the threat of invasive species. The development and operation of Chinese domestic law regimes for the control of marine invasive species are considered next. The paper questions whether Chinese law is adequate to combat invasive species from ballast water. China has yet to ratify the BWM

[5] Section 9, Current Situation of Marine Invasive Species, 2006 National Report on the Quality of Marine Environment, State Oceanic Administration (SOA), China (in Chinese).

[6] 'Red-tide-inducing species include *Chaetoceros concavicornis, Cyclindrotheca closterium, Melosiar cancellate*' <www.ln.xinhuanet.com/wangtan/yazaishui/> accessed 17 Oct. 2012 (in Chinese).

[7] Section 5, Marine Environmental Disasters, 2010 National Report on the Quality of Marine Environment, SOA, China (in Chinese).

[8] Section 7, Red Tides, 2005 National Report on the Quality of Marine Environment, SOA, China (in Chinese).

[9] M Zhou, J Li, B Luckas, R Yu, T Yan, C Hummert and S Kastrup, 'A Recent Shellfish Toxin Investigation in China' (1999) 39 *Marine Pollution Bulletin* 331–334.

[10] See n 5.

Convention. However, in light of gaps in the current legal regime, the paper argues that there is a need to develop a stronger domestic regulatory approach. Although there are some political and economic costs for implementing the measures required under BWM Convention, the potential benefits that could result from China's ratification seem to outweigh these costs.

International Legal Regime

The international community has addressed the challenge of marine invasive species through a number of general agreements, including the United Nations Law of the Sea Convention (LOSC) and the Convention on Biological Diversity (CBD). Article 196(1) of the LOSC provides one of the earliest references to marine alien species.[11] It provides that States shall take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto.[12] Besides the general obligation for all States to prevent invasive species, the LOSC establishes a carefully balanced jurisdictional framework between flag and coastal States (including port States) with different legislative means for the implementation and enforcement.[13]

However, since the adoption of the LOSC in 1982, the evolution of global comprehension of the relationship between human activities and the environment and the concept of sustainable development has taken the next step to an even more holistic or integrated approach based on an ecosystemic view.[14] After the 1992 United Nations Conference on Environment and Development (UNCED), two important treaties were adopted: the Convention on Biological Diversity (CBD)[15] and the United Nations Framework Convention

[11] K Scott, 'Defending the World below the Brine, Managing Invasive Species under the 2004 Ballast Water Convention—A New Zealand Perspective' (2008) 14 *Journal of International Maritime Law* 309.

[12] Art. 196 (1), United Nations Convention on the Law of the Sea, 21 *International Legal Materials* (1982) 1261–1354.

[13] For details, see NY Liu, 'International Legal Framework on the Prevention of Vessel-Source Pollution' (2010) 12 *China Oceans Law Review* 238.

[14] M McConnell, 'Ballast and Biosecurity: The Legal, Economic and Safety Implications of the Developing International Regime to Prevent the Spread of Harmful Aquatic Organisms and Pathogens in Ships' Ballast Water' (2003) 17 *Ocean Yearbook* 238.

[15] United Nations Conference on Environment and Development: Convention on Biological Diversity, 31 *International Legal Materials* (1992) 818–841.

on Climate Change (UNFCCC).[16] Furthermore, two non-binding instruments also resulted from UNCED: the official Declaration of the Conference (Rio Declaration)[17] and Agenda 21.[18] These instruments have now entered into the process of international law-making as they are being applied, in various formulations, throughout the UN system and in all bodies involved in environmental protection, including protection of the marine environment, and achievement of sustainable development outside this system, as well as in States' national legislation.[19] The CBD was widely accepted by States.[20] According to Article 8(h), "[e]ach Contracting Party shall, as far as possible and as appropriate... prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species".[21]

The IMO is currently playing the leading role on combating invasive species from ballast water. The IMO adopted the 1973 International Convention for the Prevention of Pollution from Ships (amended by the 1978 Protocol) (MARPOL) with the aim to achieve the complete elimination of intentional pollution of the marine environment by oil and other harmful substances and the minimization of accidental discharge of such substances.[22] Three aspects of MARPOL are of particular relevance to the BWM Convention: 1) the establishment of special mandatory requirements for certain areas; 2) certification and inspection regimes; and 3) the provision of reception facilities.[23] These are key concepts underpinning the operation of the BWM Convention.

In 1993, the IMO adopted the non-binding Guidelines for Preventing the Introduction of Unwanted Organisms and Pathogens from Ships' Ballast Water and Sediment Discharges in Resolution A.774 (18). These were revised by Resolution A.868 (20) Guidelines for the Control and Management of Ship's Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms as well as Pathogens) in 1997.[24] The Guidelines were an important develop-

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[16] United Nations Conference on Environment and Development: Framework Convention on Climate Change, 31 *International Legal Materials* (1992) 849–873.

[17] United Nations Conference on Environment and Development: Rio Declaration on Environment and Development, 31 *International Legal Materials* (1992) 874–880.

[18] http://www.un.org/esa/dsd/agenda21/.

[19] Patricia Birnie, 'Implementation of IMO Regulations and Oceans Policy Post-UNCLOS and Post-UNCED' in Myron H Nordquist and John N Moore (eds.), *Current Maritime Issues and the International Maritime Organization* (Martinus Nijhoff Publishers, Leiden, 1999) 361.

[20] At the time of writing there are 193 Parties to the CBD <www.cbd.int/convention/parties/list/> accessed 17 Oct. 2012.

[21] COP 6 Decision VI/23, Guiding Principles for the Implementation of Article 8 (h).

[22] Para.5, Preamble, MARPOL73/78.

[23] MHF Souza Rolim, *The International Law on Ballast Water. Preventing Biopollution* (Martinus Nijhoff Publishers, Leiden, 2008) 54.

[24] A20/Res.868, 1 December 1997 <globallast.imo.org/868%20english.pdf> accessed 17 Oct. 2012.

ment because they set forth internationally agreed management practices and called for uniform action by states. However, the Guidelines provide little incentive for treatment innovation as they rely heavily on the mid-ocean exchange of waters taken up from coastal waters in the vicinity of the port of origin for oceanic waters.[25]

The BWM Convention was adopted in 2004 with the specific focus of controlling the threat of invasive species from ballast water. Although the BWM Convention is not yet in force, some States, e.g., the United States, Australia, and Brazil, have been pro-active and have implemented domestic measures consistent with the provisions of the BWM Convention.[26] The BWM Convention will enter into force 12 months after ratification by 30 states which represent at least 35 per cent of the gross tonnage of the world's merchant shipping.[27] As of 12 Sept 2012, 36 countries have ratified the BWM Convention. Ratifying states include: Canada; European Union (EU) Member States (Denmark, Sweden, Netherlands, France and Spain); shipping powers (Norway and South Korea); small island states (Maldives, Cook Islands, Marshall Islands and Tuvalu); and developing economies such as Mexico, Brazil, Egypt, Kenya and South Africa. The combined merchant fleets of countries that have ratified the BWM Convention constitute approximately 29.07 per cent of the gross tonnage of the world's merchant fleet.[28] It is obvious that the acceptance of the BWM Convention within the international community is emerging.

The BWM Convention establishes a two-tier process for ballast water management. This includes general standards set by the BWM Convention and special requirements in certain areas that can be established by coastal States.[29] The BWM Convention, in combination with its Annex and supplementary Guidelines, identifies four discrete elements integral to ballast water management. These are: planning and record keeping; management of sediment uptake and discharge; management of ballast water uptake and discharge; and special area requirements. Additional obligations relate to notification, the provision of information, research and development, cooperation, enforcement,

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[25] J Firestone and JJ Corbett, 'Coastal and Port Environments: International Legal and Policy Responses to Reduce Ballast Water Introductions of Potentially Invasive Species' (2005) 36 *Ocean Development and International Law* 294.

[26] CL Hewitt, 'Marine Biosecurity Issues in the World Oceans: Global Activities and Australian Directions' (2003) 17 *Ocean Yearbook* 193–212.

[27] Article 18(1), BWM Convention.

[28] BWM status of ratification, <http://globallast.imo.org/index.asp?page=announcements.asp#228> accessed 17 Oct. 2012.

[29] BWM/CONF/36 ANNEX, Regulations for the Control and Management of Ships' Ballast Water and Sediments, Section C—Special Requirements in Certain Areas.

and compliance.[30] The BWM Convention sets ballast water exchange/performance standards and deadlines for different categories of ships to meet. In any case, from 2016, all ships in the world conducting ballast water management shall discharge less than 10 viable organisms per cubic metre greater than or equal to 50 micrometres in minimum dimension and less than 10 viable organisms per milliliter less than 50 micrometres in minimum dimension and greater than or equal to 10 micrometres in minimum dimension.[31]

China is generally supportive of international law on the protection of the marine environment.[32] China ratified both the LOSC (in 1996) and the CBD (in 1993). China is also actively involved in the ratification and implementation of the relevant international Conventions that deal with vessel-source pollution. In 1983, China ratified MARPOL and its Annexes I and II. Many of the provisions and standards from MARPOL were incorporated into China's 1982 Marine Environmental Protection Law and the 1983 Regulation. China has also ratified: MARPOL Annex III (in 1994); Annexes IV and VI (in 2006); Annex V (in 1988); and the International Convention for the Safety of Life at Sea (SOLAS) (in 1994). Most recently, China ratified the International Convention on the Control of Harmful Anti-fouling Systems on Ships (Anti-Fouling Convention) in 2011. This entered into force for China from 17 June 2011.[33] China has, however, yet to become a Party to the BWM Convention. Despite this, as one of six pilot countries (Iran, India, Ukraine, South Africa, Brazil and China), China actively participates in the Globallast program which is co-organized by the IMO, the Global Environment Facility (GEF) and the United Nations Development Program (UNDP). This program aims to assist less-industrialized countries to prepare for the implementation of the BWM Convention.[34] In 2009, China submitted its own ballast water management system plans to the IMO. It received basic approval from IMO in March 2010.[35]

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[30] See n 11, at 312.

[31] Regulation D-1 (Ballast water exchange standards), Regulation D-2 (Ballast water performance standards), Regulation B-3 (Ballast water management for ships), ANNEX to the BWM Convention.

[32] KY Zou, 'Implementing Marine Environmental Protection Law in China: Progress, Problems and Prospects' (1999) 23 *Marine Policy* 207–225.

[33] Announcement by the Ministry of Transport, No. 22, 22 April 2011, the Entry into Force of the IMO Anti-Fouling Convention in P. R. China (in Chinese).

[34] The Globallast Project, Phase I, <globallast.imo.org/index.asp?page=gef_interw_project.htm&menu=true> accessed 17 Oct. 2012.

[35] Table (1)—List of ballast water management systems that make use of Active Substances which received Basic Approval from IMO <www.imo.org/OurWork/Environment/BallastWaterManagement/Documents/table%20updated%20in%20October%202010.pdf> accessed 17 Oct. 2012.

Chinese Legal Framework

Legislation

Over the last three decades China has promulgated a series of statutes and regulations to address the threat of marine pollution from vessels. These include: the 1983 Maritime Transport Safety Law (MTSL);[36] the 1982 Marine Environmental Protection Law (MEPL), as amended in 1999; and the Islands Protection Law (IPL) 2009.[37] This was followed by the adoption of the Regulation on the Prevention and Control of Marine Pollution from Vessels (2010 Regulation; adopted by the State Council in 2009 and entered into force 1 March 2010). The 2010 Regulation replaced the 1983 Regulation on the Prevention and Control of Vessel-Source Pollution (1983 Regulation). A series of rules were adopted by the Ministry of Transport after the entry into force of the 2010 Regulation. These include: the Implementing Rules on the Insurance for Civil Liability of Damage by Vessel-Source Oil Pollution;[38] the Rules on the Prevention and Control of Marine Pollution from Ships and Relevant Operating Activities (Rule No.7, 2010);[39] the Rules on the Contingency Plan and Contingency Response of Vessel-Source Marine Pollution;[40] and the Rules on the Investigation of Vessel-Source Pollution Accidents at Sea.[41]

Despite China having ratified key instruments on the prevention of pollution from ships, and adopting general marine environmental laws, there is a lacuna in the Chinese legal system for preventing invasive species from ballast water. No detailed legislation specifically addresses the transfer of harmful aquatic organisms in ballast water. The issue is only referred to in the MEPL (adopted in 1982 and revised in 1999) and is mentioned in part under the Frontier Health and Quarantine Law (FHQL, adopted in 1986, revised in 2007).

Article 62 (1) of the MEPL states that all ships shall not discharge any pollutants, wastes, ballast water, garbage and other noxious substances into sea areas under China's jurisdiction. Illegal discharge from vessels in sea areas under China's jurisdiction will result in administrative (e.g., fines, detention)

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[36] Decree of the President of the P. R. China (No. 7), Maritime Transport Safety Law, Standing Committee of National People's Congress Gazette, Issue No. 4, 1983, pp. 19–25 (in Chinese).

[37] Decree of the President of the P. R. China (No. 22), Islands Protection Law, Standing Committee of National People's Congress Gazette, Issue No. 1, 2010, pp. 20–25 (in Chinese).

[38] Decree of the Ministry of Transport, No. 3, 2010 (in Chinese).

[39] Decree of the Ministry of Transport, No. 7, 2010 (in Chinese).

[40] Decree of the Ministry of Transport, No. 4, 2011 (in Chinese).

[41] Decree of the Ministry of Transport, No. 10, 2011 (in Chinese).

or even criminal sanctions.[42] Article 15 of Regulation 2010 provides: "ships that discharge garbage, sewage, oily sewage, sewage containing noxious and hazardous substances, exhaust gas and other pollutants, as well as ballast water, shall comply with laws, regulations, international conventions and relevant standards ratified or acceded to by China". Neither the MEPL nor Regulation 2010 contains detailed requirements for the discharge of ballast water.[43]

The FHQL pays attention to ballast water management. Under Art.18(4) of the FHQL, frontier health and quarantine officers shall, in accordance with State health standards, supervise sanitary conditions of frontier ports and vessels (in- and outbound) at frontier ports, and supervise and inspect the disposal of garbage, waste, sewage, excrement and ballast water. International ships are prohibited from discharging ballast water during their stay at Chinese ports without the approval of quarantine officers (Art.29, Rules for Administration of Quarantine and Inspection of International Shipping on Entry or Exit at Frontier Ports, adopted by the State Administration of Quality Supervision, Inspection and Quarantine in 2002). The procedure for the application for approval is provided by Art.20 of the Rules for Requirements of Maritime Administrative Approval (adopted by the Ministry of Transport in 2006). Nevertheless, the FHQL and its associated rules are only concerned with the prevention of epidemics that might result from ballast water. Invasive species are ignored.

Institutions

Several authorities are involved in ballast water management in China. Art.5 of the MEPL designates the Maritime Safety Administration (MSA) as the competent department for the implementation of the MEPL and Regulation 2010. Ballast water management is therefore within the competence of the MSA. This was confirmed by China's response to the Questionnaire on Ballast Water Management from the IMO's Marine Environment Protection Committee (MEPC/Circ.342).[44] The MSA is affiliated to the Ministry of Transport. The headquarters of the MSA is in Beijing. Along the coastline and the Yangtze, Pearl and Heilongjiang Rivers are 20 regional/provincial MSAs,

[42] Chapter 9, 1999 MEPL.

[43] Art.75 of Regulation 2010 states that if there is a conflict, international Conventions ratified by China prevail over domestic legislation. The National Standard is still valid but not applied in practice any more. Instead, the Maritime Safety Administration (MSA) (Central level) translates the latest discharge standard of MARPOL Annexes and circulates discharge standards to local MSAs by notification (Tong Zhi) for enforcement.

[44] Harmful Aquatic Organisms in Ballast Water, Compilation of Responses to the Questionnaire on Ballast Water Management (MEPC/Circ.342), MEPC 43/4/6, p.11.

under which 97 local branches have been established. The MSA has a working team consisting of 25,000 officials, other working staff, and a patrol force of 1,300 vessels and craft of various types.[45] Generally, each coastal province has its own provincial MSA, which is directly controlled from the headquarters of the MSA.[46] These provincial MSAs are normally based in the capital city or the most important port city of that coastal province. Furthermore, city-level MSAs are set up in major port cities. Finally, MSAs at city level have several units (Maritime Safety Unit or *haishichu*) responsible for actual enforcement and on-site activities. The MSA system is a centralized system. This means individual offices within local MSA bureaucracies are not responsible to superiors within local governments; rather, they are directly controlled by their functional administrative superiors and have only a consultative relationship with local government.[47] The provincial MSAs are relatively independent administrations from local government control, as they are directly led by the MSA headquarters in Beijing.[48] This arrangement is due to the international and technical nature of the shipping industry, and the need to ensure that international shipping standards are met. As such, local governments cannot directly control personnel, budgetary and other related arrangements of the MSAs.

All vessels need approval from the MSA before they are allowed to discharge ballast water into sea areas under China's jurisdiction. The MSA oversees the discharge and reception of ballast water that might cause oil pollution. However, no inspection or sampling work is done by the MSA before it issues the approval. The MSA has no legal obligation or operational capacity to do

[45] Official website of China's MSA: <en.msa.gov.cn/msa/features/root/01/0104/1224132186529> accessed 18 Oct. 2012.

[46] Along China's coastline are 12 provincial MSAs: Tianjin, Hebei Province MSA (based at Qinghuangdao), Shandong Province MSA (based at Qingdao, Liaoning Province MSA (based at Dalian), Jiangsu Province MSA (based at Nanjing), Shanghai MSA, Zhejiang Province MSA (based at Hangzhou; however, the most important port in Zhengjiang Province is Ningbo-Zhoushan, which also ranks as one of the top 10 busiest ports in the world), Fujian Province MSA (based at Fuzhou; however, the most important port in Fujian Province is Xiamen), Shenzhen MSA, Guangdong Province MSA (based at Guangzhou), Guangxi Province MSA (based at Nanning) and Hainan Province MSA(based at Haikou). China MSA Subordinate Bureaus <en.msa.gov.cn/msa/features/root/01/0102> accessed 18 Oct. 2012.

[47] AC Mertha, 'China's "Soft" Centralization: Shifting Tiao/Kuai Authority Relations' (2005) 184 *China Quarterly* 792.

[48] Chinese administrative units generally distinguish between two types of political relationships: those governed by binding orders, and those based on non-binding instructions. Any political unit in China has the second type of relationship with any number of other units. But it has the first type of relationship with only one, its direct "superior". A relationship based upon such binding orders is referred to as "leadership relations" or *lingdao guanxi*. The other type is based on "professional relations" or *yewu guanxi*. See *ibid.*, at 797.

so. There is no inspection of invasive species from ballast water because the BWM Convention has not entered into force yet. Consequently, as long as they submit an application to the MSA (normally it will be approved), vessels are in a free world of discharging their ballast water into sea areas under China's jurisdiction.

The State Administration of Quality Supervision, Inspection and Quarantine (SAQSIQ) is the designated authority for the implementation of the FHQL. The SAQSIQ is directly led by the State Council of P. R. China. The Chinese Government has declared that the SAQSIQ is one of the "competent authorities" mentioned in Art.22 of the International Health Regulation.[49] The SAQSIQ can require ships to submit a Ballast Water Application Form similar to the IMO Guidelines' Ballast Water Report. The captain of a foreign-going ship is required to declare to the SAQSIQ how much ballast water is on board, how much will be discharged and where the water originated from.[50] The SAQSIQ is the first authority that a vessel will meet after calling at a Chinese port. Nevertheless, the SAQSIQ only deals with epidemics that might result from ballast water.

The State Oceanic Administration (SOA) is also involved with ballast water issues. The SOA is affiliated with the Ministry of Land and Resources. Art.5 of the MEPL provides that the SOA shall be responsible for the monitoring, surveillance, assessment and scientific research of the marine environment. The SOA has published an Annual Report on the Quality of the Marine Environment since 2000. Invasive species from ballast water have been mentioned on occasion, especially in connection with red tides. Nevertheless, a comprehensive inventory of invasive species in China's marine ecosystems has never been created. This is the foundation for preventing marine invasive species in China.

So far no coordination scheme has been established among competent authorities for preventing invasive species from ballast water. A coordination office for preventing invasive species in general does exist in China; it is affiliated with the Ministry of Agriculture.[51] This office was set up to coordinate the work of administrations, including agriculture, forestry, quarantine, ocean, customs, science and technology, and environmental protection, on invasive

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[49] Para. 2, Statement by the Government of the P. R. China on China's Implementation of the International Health Regulations <www.who.int/ihr/China2007.pdf> accessed on 18 Oct. 2012.

[50] Ballast Water Application Form, published by SAQSIQ since 7 June 2001.

[51] The Central Government of P. R. China, Officials from Ministry of Agriculture, State Forestry Administration and State Quality Supervision, Inspection and Quarantine Administration on the prevention of invasive species in China, http://www.gov.cn/zxft/ft62/ (in Chinese).

species. However, it is doubted that a single office within the Ministry of Agriculture could effectively play a leading role to work with other ministries. This might create more bureaucracy for the issue of marine invasive species. Furthermore, in the author's opinion, the MSA, as the competent authority to deal with vessel-source pollution in China, should play the leading role for the prevention of invasive species from ballast water.

China and the BWM Convention

China's Concerns

As mentioned above, China is generally supportive of international law on the protection of the marine environment. However, China is traditionally not pro-active in the implementation of IMO Conventions. China normally ratifies IMO Conventions after their entry into force. These IMO Conventions are then implemented domestically through national legislation. Economic concerns also contribute to the issue. For example, in 2008 when the Anti-Fouling Convention entered into force, the Chinese painting industry had just started the DDT project to replace harmful TBT-based products.[52] It took 3 years for the DDT painting products made by Chinese companies to be ready for the market. This is one reason why China only adopted the Anti-Fouling Convention in 2011.

China has not ratified the BWM Convention. There appear to be technical and economic reasons for this position. The BWM Convention applies to all ships entitled to fly the flag of a state which is party to the BWM Convention and ships that operate under the authority of a BWM Convention party.[53] The obligations of flag States under the BWM Convention can be grouped into four categories: (i) ensuring compliance with the BWM Convention; (ii) developing ballast water management plans and related documents; (iii) issuing International Ballast Water Management certificates; (iv) managing ballast

[52] Anti-fouling paints are used to coat the hull of ships to prevent sea life such as algae and molluscs attaching themselves to the hull and slowing down the ship and increasing fuel consumption. In the early days of sailing ships, lime and later arsenic were used to coat ships' hulls, until the modern chemicals industry developed effective anti-fouling paints using metallic compounds. These compounds slowly "leach" into the seawater, killing barnacles and other marine life that have attached to the ship. Studies have shown that these compounds persist in the water, killing sea life, harming the environment and possibly entering the food chain. One of the most effective anti-fouling paints, developed in the 1960s, contains organotin tributylin (TBT), which has been proven to cause deformations in oysters and sex changes in whelks.

[53] Art.3 (1), BWM Convention.

tank sediments.[54] It is obligatory for ships to meet new ballast water management and control requirements set by the BWM Convention. These obligations vary in accordance with the construction date of the vessel.[55] With their scientific expertise and financial capacity, at present only developed states have consistently managed to produce studies and technology to support the effective treatment of ballast water. China does not have the technical capacity to implement all the requirements of the BWM Convention yet. At present, research into ballast water treatment technology is driven not only by ecological considerations, but also by commercial incentives.[56]

A second major concern is believed to be the potential costs of implementing the BWM Convention. China adopted its open-door policy in 1978. This was followed by 30 years of rapid development, which has led to exponential growth in the shipping industry. This industry plays a vital role for the Chinese economy. In 2009, China overtook Germany as the third-largest ship-owning country in the world. Owners from China controlled 8.96 per cent of the world's tonnage.[57] China has also emerged as the world's largest shipbuilder, and expanded its dry bulk shipbuilding capacity by a factor of six between 2008 and 2010.[58] Therefore, the installation of a new ballast water management system will be a very heavy burden for China's shipping industry. This is also the reason why China has submitted its own ballast water management systems to be approved by the IMO in 2011.[59] The government hopes that Chinese companies could develop affordable technology for the Chinese shipping industry.

The BWM Convention establishes obligations for port and coastal States with respect to four key areas: sediment reception facilities, communication of information, inspection, and protected areas.[60] Art.9 of the BWM Conven-

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[54] See n 18, at 110–112.

[55] Section B-Management and Control Requirements for Ships, Section D-Standards for Ballast Water Management, Regulations for the Control and Management of Ships' Ballast Water and Sediments, BWM Convention.

[56] Alan Tan, *Vessel-Source Marine Pollution, The Law and Politics of International Regulation* (Cambridge University Press, Cambridge, 2006) 170.

[57] United Nations Conference on Trade and Development Review of Maritime Transport 2010, p.35. <www.unctad.org/en/docs/rmt2010_en.pdf> accessed 18 Oct. 2012.

[58] Ministry of Transport & Legislative Affairs Office of State Council, China, *The Legislative Interpretation of 2009 Regulation on the Prevention and Control of Marine Pollution from Vessels*, China Communications Press, Beijing 2010, pp. 146, 147 (in Chinese).

[59] Harmful Aquatic Organisms in Ballast Water, Information on the Type Approval of the Blue Ocean Shield Ballast Water Management System, Submitted by China, MEPC 62/INF.28, 6 May 2011.

[60] See n 18, at 114–121.

tion provides that a sample of the ship's ballast water shall be inspected by officers. China has a coastline of 18,000 kilometers with over 134 international ports. The MSA lacks expertise and technology to sample ballast water for controlling invasive species. Moreover, there is no comprehensive information about native and invasive species in the marine ecosystems under China's jurisdiction. Chinese government preparation for the implementation of the BWM Convention will take time and will require the training of inspectors and procurement of technical equipment. At present there is no detailed schedule for the preparation period for the development of ballast water controls, which may take years to implement. A similar story played out in China's ratification of the Anti-Fouling Convention, as mentioned above.

Benefits

It is arguable that China could actually benefit from becoming a Contracting Party to the BWM Convention. This is because China's ratification would help to address the lacuna in the Chinese legal system to prevent invasive species from ballast water that cause adverse effects on the marine environment, such as outbreaks of red tides. The BWM Convention is close to meeting the criteria for its entry into force. China possesses 8.96% of the world's tonnage, so the BWM Convention would enter into force in one year from the date of China's ratification. Art.15 of Regulation 2010 provides that ships that discharge ballast water shall comply with laws, regulations, relevant standards, and international conventions ratified or acceded to by China. After China's ratification of the BWM Convention, the BWM Convention will provide the domestic legal basis for preventing invasive species from ballast water in sea areas under China's jurisdiction. The BWM Convention sets requirements for port State inspection of foreign vessels, which need to be followed by Chinese authorities.

It is arguable that China's ratification of the BWM Convention would help maintain the international competitiveness of the Chinese shipping industry. This is because it would require all foreign-flagged vessels entering Chinese waters to adopt certain ballast water control measures. Since China is a major trading nation, it is unlikely that the burden of the ballast water control would be prejudicial only to Chinese shipping interests.

In any event, Chinese vessels may already be subject to certain ballast water controls when entering other States' coastal waters and ports. If Chinese-flagged shipping wishes to maintain or engage in trading relations with certain nations, then it will have adapt to such demands. The BWM Convention recognizes that several States have taken individual action to prevent, minimize

and ultimately eliminate the introduction of harmful aquatic organisms and pathogens by ships entering their ports.[61] For example, Australia was one of the first countries to seek international action for the prevention of invasive species from ballast water. As summarized by the Globallast Program Legislative Review:[62]

> Australia implemented Guidelines in 1990, which are said to be the model for the 1991 IMO Guidelines. In 1994 Australia adopted a coordinated national approach to this problem, including support for research into management techniques. In addition, a computer-based decision-support system (DSS) for targeting high-risk vessels was designed to avoid unnecessary inspections. A Ballast Water Research Development Levy on ships was introduced to help support these activities. There are also cost recovery fees for inspection and documentation services. Coastal ballast water management guidelines were also developed on a pilot project (3 ports) basis. The Australian Ballast Water Management Requirements were mandatory as of July 2001. They are understood to be consistent with the IMO Guidelines and the developing international regime.

Another example is the United States. In 2004, the U.S. Coast Guard (USCG) published regulations requiring vessels to maintain a ballast water management plan that involves mid-ocean exchange of ballast water, retention of ballast water, or approved environmentally sound alternatives, and established a national mandatory ballast water management program.[63]

Consequently, Chinese vessels sailing to Australian or US ports must follow the ballast water management requirements of those port States. Chinese vessels have to be well equipped with ballast water exchange technology. In contrast, foreign vessels have no obligation to carry out any ballast water management system in sea areas/ports under China's jurisdiction. They only have to submit an application before discharging ballast water. Furthermore,

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[61] Para. 8, Preamble, the BWM Convention.

[62] Globallast Legislative Review, p.71 <globallast.imo.org/monograph1%20legislative%20review.pdf> accessed 18 Oct. 2012.

[63] The 1990 U.S. Non-indigenous Aquatic Nuisance Prevention and Control Act (NANPCA) was the first federal law to address the problem of aquatic invasive species. It focused mainly on ballast water introductions. The NANPCA contained provisions that required ships headed for the Great Lakes to exchange their ballast water at sea. The law was reauthorized in 1996, renamed the National Invasive Species Act (NISA) and expanded to encourage, but not require, ballast water exchange for all ships arriving from outside the 200-nautical-mile U.S. exclusive economic zone (EEZ). NISA also made reporting of ballast water management to a national registry mandatory for all ships entering U.S. ports. See DM King and M N Tamburri, 'Verifying Compliance with Ballast Water Discharge Regulations' (2010) 41 *Ocean Development and International Law* 152–153.

a strong domestic regime would potentially allow for some cost recovery mechanism, thereby helping to defray the costs of its operation.

Recommendations for Reform

Sea areas under China's jurisdiction are under threat from invasive species from ballast water. A lacuna exists within the Chinese legal system to deal with the problem. It is recommended that China should accelerate its preparation work and ratify the BWM Convention in the near future. China's preparation would include: the production and installation of an IMO-approved ballast water management system for the Chinese shipping industry; a comprehensive marine species inventory conducted by the SOA so as to have a clear idea about indigenous and invasive species in sea areas under China's jurisdiction; better coordination among competent authorities; training of MSA officers; improvement of inspection equipment and technology.

China's ratification of the BWM Convention would only be the first step to combat invasive species from ballast water. The BWM Convention establishes a two-tiered approach. The first tier of standards subjects all ships (new and existing) to baseline requirements for ballast water management.[64] This universally applicable first tier is complemented by second-tier rules. According to the Annex of the BWM Convention (Regulations for the Control and Management of Ships' Ballast Water and Sediments), if it is believed to be necessary, a Party may require ships to meet a specified standard or requirement in addition to those in Section B (Regulation C-1). Furthermore, a Party can designate areas under its jurisdiction where ships should not take up ballast water due to known conditions (Regulation C-2). If China ratifies the BWM Convention, only first-tier standards will be subsequently applied to sea areas under China's jurisdiction through the current legal framework (Art.15 of Regulation 2010). A domestic regulation is necessary to further implement the BWM Convention.

A proposal from the Globallast-China project suggests that Provisional Rules concerning Management and Control of Ships' Ballast Water and Sediments should be adopted.[65] These Regulations would include the following requirements:

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[64] Section B, Management and Control Requirements for Ships. Annex: Regulations for the Control and Management of Ships' Ballast Water and Sediments, BWM Convention.

[65] Strategic Plan for China's Ballast Water Management, submitted by GloBallast-China Project to Global Ballast Water Management Programme (wenku.baidu.com/view/41b6d41bff00bed5b9f31d6b.html).

(i) Reporting procedure and reporting form
The reporting procedure of MARPOL may be considered for this purpose. The reporting form should be in accordance with the recommended form in IMO Resolution A. 868(20) as much as possible. Such reporting may be done before the ship's arrival at the port or while going through entry formalities, either by the captain of the ship or through his shipping agent.

(ii) Record making and record keeping onboard.

(iii) Measures taken by ships to minimize the introduction of aquatic harmful organisms and pathogens.
Such measures include: ballast water treatment which may be required by the Port State; regular removal of sediments; measures taken when loading ballast water.

(iv) Implementation of future technical standards of ballast water treatment.

(v) Ballast water management plan on board.
This instrument will require all ships under the Chinese flag to be equipped with ballast water management plans which will be based on the model plan recommended by IMO and will be specific to each ship.

(vi) Control and inspection.
This part may include requirements for Flag State control and Port State control, which may be focused on inspection of reporting, record keeping, and the ballast water management plan on board. The inspectors may take samples if necessary to monitor compliance with the provisions.

(vii) Education and training.
The ballast water management plan should include training of the crew on board. It is necessary that ballast water control and management be included in the syllabus of the maritime universities.

It is believed this is a commendable proposal. However, in the Chinese legal system, a provisional Rule as suggested above has relatively weak legal authority. It is a form of legislation which is normally issued by ministries, and it will not be given effect if it clashes with higher-level legislation, such as a Law or Regulation. In the author's opinion, the State Council should play a leading role in the development of legislation and adopt a Regulation on ballast water controls. The Regulation should clearly authorize the MSA as the competent authority.

Conclusions

China's marine environment is under threat from invasive species introduced by ballast water. It is recommended that China should set aside its concerns about the costs of implementation and ratify the BWM Convention. China's ratification will fast-track the entry into force of the BWM Convention. This entry into force would in turn provide the legal basis for Chinese authorities to take action against invasive species from ballast water. Meanwhile, China's shipping industry could still maintain international competitiveness, since the costs of the measures would apply generally to all ships that enter Chinese ports, and not just to Chinese-flagged vessels. A clear timeline should be established for China's implementation of the BWM Convention, including for scientific research, production and installation of new ballast water management systems, a comprehensive survey of original and invasive species and the marine ecosystems of sea areas under China's jurisdiction, training of port State inspection officers, and improvement of inspection technology. Besides the ratification of the BWM Convention, China should also consider the adoption of a new domestic regulation to transfer the BWM Convention into the domestic legal system.

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