

Chapter 6

Shipping and the conservation of marine biodiversity: legal responses to vessel-strikes of marine mammals

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1 INTRODUCTION

It is widely recognised that the continued proliferation of anthropogenic activities within the marine environment has placed heavy conservation pressures upon an extensive range of aquatic species. Particular concerns have been raised over the widespread deterioration of marine habitats and ecosystems, for which a substantial contribution has been ascribed to the shipping industry. In recent years, scientists, conservationists and policy-makers have identified a troubling litany of vessel-source impacts upon the marine environment. Regulatory awareness of the adverse environmental implications of intensive vessel traffic has accordingly grown appreciably in a variety of international fora. Beyond general powers prescribed under the UN Convention on the Law of the Sea 1982¹ to mitigate the ecological hull-print of international shipping activities, vessels have long been subject to specific restrictions on dumping and emissions through the application of MARPOL² and numerous discharge and pollution-control regimes.³ Latterly, new pressures

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¹ 1883 UNTS 396 (hereinafter 'LOSC'); see especially Part XII.

² International Convention for the Prevention of Pollution from Ships 1973, as Modified by the Protocol of 1978 Relating Thereto: 1340 UNTS 62.

³ Notably the Convention on the Prevention of Marine Pollution by Dumping of Wastes or Other Matter 1972: 1046 UNTS 120. On the development of vessel-source pollution standards generally see AK-J Tan, *Vessel-Source Marine Pollution: The Law and Politics of International Regulation* (Cambridge: Cambridge University Press, 2012) at 29 to 104; on the regulation of land-based sources of pollution in the oceans see D Hassan, 'International Conventions Relating to Land-Based Sources of Marine Pollution Control: Applications and Shortcomings' (2004) 16 *Georgetown International Environmental Law Review* 657.

on the marine environment arising from vessels – such as the unregulated release of ballast water⁴ and the pernicious effects of ocean noise⁵ – have also been identified and addressed. To date, however, one particular threat posed to marine wildlife by shipping activities has received minimal attention from legal commentators, namely the problems presented by vessel-strikes.

Vessel-strikes have been confirmed as a serious threat to the conservation status of a number of individual species of marine mammals, with cetaceans (whales, dolphins and porpoises), pinnipeds (seals, sea lions and walrus), sirenians (manatees and dugongs) and sea turtles considered especially vulnerable. In some instances, particularly where populations are heavily depleted, vessel-strikes may even imperil the very survival of certain species.⁶ Moreover, while this issue has been viewed predominately from a conservation perspective, vessel-strikes also constitute a significant and under-appreciated risk to navigational safety. Indeed, collisions with large oceanic mammals may result in substantial physical damage to vessels, as well as serious injuries and even fatalities to their passengers and crew. Whichever concern is given most credence, it is clear that the establishment of a comprehensive and coherent regulatory framework to mitigate the problem of vessel-mammal interactions is becoming increasingly exigent.

To date, vessel-strikes have been addressed on a predominantly localised level, through the introduction of navigational restrictions and requirements in a small, but growing, number of jurisdictions and in respect of particular marine species. Regulatory responses, however, remain hamstrung by a global lack of data on the areas and species most affected, as well as the relatively low political visibility traditionally accorded to vessel-strike concerns. Indeed, although a plethora of multilateral regimes have been established to regulate marine mammals, this problem has traditionally occupied a comparatively lowly position on their respective agendas. Nevertheless, vessel-strikes have received increasing attention in recent years, which has prompted a reconsideration of navigational policies as well as the development of mitigation strategies by a number of key international organisations in addressing this issue.

⁴ For an appraisal of these developments, see chapter <X> in this volume by Rosalie Balkin.

⁵ See especially HM Dotinga and AG Oude Elferink, 'Acoustic Pollution in the Oceans: The Search for Legal Standards' (2000) 31 *Ocean Development and International Law* 151; EM McCarthy, 'International Regulation of Transboundary Pollutants: The Emerging Challenge of Ocean Noise' (2001) 6 *Ocean and Coastal Law Journal* 257; KN Scott, 'International Regulation of Underwater Noise' (2004) 53 *International and Comparative Law Quarterly* 287; and A Gillespie, 'Noise Pollution, The Oceans, and the Limits of International Law' (2010) 21 *Yearbook of International Environmental Law* 114.

⁶ See SD Kraus *et al.*, 'North Atlantic Right Whales in Crisis' (2005) 309 *Science* 561.

This chapter therefore seeks to appraise the regulatory initiatives developed to date in respect of vessel-strikes. To this end, this chapter will first outline the scope of the problem, noting that considerable emphasis should be placed on navigational matters and vessel speed in areas of critical habitats in framing present and future mitigation measures. Accordingly, there will also be an evaluation of the role of the International Maritime Organization (IMO), the primary global body responsible for shipping safety and navigational practices, in mitigating this problem. This chapter will also evaluate the policies elaborated by leading species-specific regulators, namely the International Whaling Commission (IWC) and key regional marine mammal organisations, arguing that a unique practical toolkit of navigational and conservation policies may now be considered to exist to address vessel-strike concerns – where sufficient political will and support from the shipping industry is present.

2 MARINE MAMMALS AND VESSEL-STRIKES: MONITORING PROBLEMS AND REGULATORY CHALLENGES

Vessel-strikes are considered to pose a threat to the conservation status of a wide array of marine mammals, although there are significant practical difficulties in clarifying both the scale of the problem and the individual species most at risk. To date, the majority of research conducted into this issue has essentially focused on particular species of cetaceans, with vessel-strike concerns having been most ostensibly associated with large whales. Indeed, it is considered that '[a]ll whales are potentially subject to collisions with ships, and incidents have been reported with most species'.⁷ To date, however, research efforts have largely concentrated on a relatively limited range of species and populations of whales. Substantial knowledge gaps, therefore, remain throughout a number of marine regions, while comparatively little is known about the vessel-strike risks faced by smaller species of marine mammals.

Anecdotal evidence of vessel-strikes has existed for decades, with sporadic interactions observed between whales and steam-powered ships in the early 20th century.⁸ Subsequent technical developments in the shipping industry since the 1950s, with the dramatic growth in the volume of global sea traffic and the construction of progressively larger and faster vessels, have significantly

⁷ PJ Clapham, SB Young and RL Brownell, Jr, 'Baleen Whales: Conservation Issues and the Status of the Most Endangered Populations' (1999) 29 *Mammal Review* 35, at 38.

⁸ DW Laist *et al.*, 'Collisions between Whales and Ships' (2001) 17 *Marine Mammal Science* 35, at 39 to 41.

increased the scope for fatal collisions. Despite this, in marked contrast to other anthropogenic concerns, such as by-catches and pollution, clear evidence of the threat posed by vessel-strikes to marine mammals has been relative slow to emerge. Vessel-strikes have remained chronically under-recorded, often due to ignorance that collisions have occurred and a marked reluctance to report known incidents, as well as the erroneous attribution of marine mammal deaths to other causes.⁹ However, this issue is belatedly starting to attract a concerted degree of regulatory attention. The establishment of coordinated tissue banks and databases in recent years has generated significant historical data, allowing for the retrospective identification of vessel-strikes as a key mortality factor for marine mammals and prompting a reappraisal of this issue as a conservation priority. Meanwhile, the resulting emergence of global and regional strike databases also highlights genuine navigational problems for vessels and an accompanying risk of serious human injury – not least in respect of ferries and recreational craft – posed by collisions with marine megafauna.

Suspensions that vessel-strikes may impede the recovery of stocks of endangered marine mammals were conclusively confirmed in the early 1990s. At this juncture, a review of historical samples revealed that one-third of all instances of anthropogenic mortality in North Atlantic right whales in US waters were directly attributable to collisions with vessels.¹⁰ Further analyses subsequently demonstrated that fin whales were most frequently struck, with collisions also common between right, humpback, grey and sperm whales.¹¹ The particular susceptibility of these species has been attributed to their darker colouring, which renders them difficult to observe while a vessel is in transit, as well as their general behavioural characteristics, as they are slow-swimming and tend to spend a large proportion of time close to the ocean surface. A number of species of whales are also suspected to engage in bi-hemispheric sleep, and may therefore fail to appreciate the dangers posed by approaching vessels during resting periods.¹² Other factors are more anthropogenic in nature, including vessel design, where high bows render marine mammals virtually invisible at mid- to short-range distances,¹³ compounded

⁹ On the practical difficulties associated with whale autopsies see Michael J Moore *et al.*, 'Right Whale Mortality: A Message from the Dead to the Living' in SD Kraus and RM Rolland, *The Urban Whale: North Atlantic Right Whales at the Crossroads* (Cambridge, Massachusetts: Harvard University Press, 2007) at 358 to 365.

¹⁰ SD Kraus, 'Rates and Potential Causes of Mortality in North Atlantic Right Whales' (1990) 6 *Marine Mammal Science* 278 at 288.

¹¹ Laist, note 8 above, at 39.

¹² PJO Miller *et al.*, 'Stereotypical Resting Behaviour of the Sperm Whale' (2008) 18 *Current Biology* 21 at 22.

¹³ *Ibid.*

by a lack of training in or awareness of marine mammal conservation concerns. Likewise, the masking effect of pervasive ocean noise also hampers an animal's ability to detect approaching sources of potential danger. These issues have been exacerbated by the prevalence of fast vessel traffic within areas of critical habitat for particular species.¹⁴ Strong concerns have also been raised over the high numbers of struck juveniles – often because they lack the physical capacity to undertake sufficiently swift evasive manoeuvres, or have not yet mastered effective avoidance techniques – as well as pregnant females. The loss of both types of individuals severely compromises the ability of depleted stocks to regenerate.¹⁵

The problem of vessel-strikes nonetheless remains comparatively little known outside these traditional hotspots and research-intensive species. Within the southern hemisphere, '[f]ew incidence rates of vessel-caused mortality are available partly because comprehensive stranding networks and long-term necropsy programmes are scarce'.¹⁶ Moreover, although vessel-strikes are most commonly associated with pelagic species, inshore, estuarine and riverine species are also considered to be highly susceptible to collisions.¹⁷ Indeed, the threat posed to river-dwelling species is starkly illustrated by the plight of the baiji or Yangtze River dolphin, which is now widely considered to be functionally extinct.¹⁸ As with North Atlantic right whales, one-third of all baiji deaths have been attributed to boat strikes in key areas of habitat.¹⁹ As a greater volume of data has been gathered and analysed in recent years, the threat posed to smaller cetaceans from vessel-strikes is considered to be increasingly significant.²⁰ The implications of vessel-strikes for other species of marine fauna also remain under-studied, yet constitute a cause for alarm. As with river dolphins, populations of manatees have proved to be acutely vulnerable to boat strikes, which has accounted for up to one-third of all

¹⁴ S Panigada *et al.*, 'Mediterranean Fin Whales at Risk from Fatal Ship Strikes' (2006) 52 *Marine Pollution Bulletin* 1287, at 1295.

¹⁵ Kraus *et al.*, note 6 above, at 561.

¹⁶ K Van Waerebeek *et al.*, 'Vessel Collisions with Small Cetaceans Worldwide and with Large Cetaceans in the Southern Hemisphere, An Initial Assessment' (2007) 6 *Latin American Journal of Aquatic Mammals* 43 at 60.

¹⁷ *Ibid.* at 62.

¹⁸ J Guo, 'River Dolphins Down for the Count, and Perhaps Out' (2006) 314 *Science* 1860; ST Turvey *et al.*, 'First Human-Caused Extinction of a Cetacean Species?' (2007) 3 *Biology Letters* 537. The Scientific Committee of the IWC also considers the baiji to be extinct, although the most recent update in 2008 of the IUCN Red List of Threatened Species is marginally more optimistic, listing this species as 'critically endangered (possibly extinct)'.

¹⁹ S Turvey, *Witness to Extinction: How We Failed to Save the Yangtze River Dolphin* (Oxford: Oxford University Press, 2008), at 35.

²⁰ Van Waerebeek, note 16 above, at 63.

known mortality events in areas with intensive boating traffic, such as the Florida Everglades.²¹ Likewise, for many other species, the collision problem is not restricted to large vessels, which have traditionally commanded the greatest degree of concerted study and regulatory attention in this regard, with smaller animals, such as marine turtles, frequently injured by recreational craft.²²

Vessel-strikes may inflict a range of injuries upon marine mammals, with varying degrees of severity. Bow-strikes, where the bow of a vessel collides with the animal head-on and often at high speed, are almost always instantaneously fatal. Beyond this concern, scarification studies have revealed evidence that virtually all species of cetaceans are susceptible to lacerations from propellers.²³ Nonetheless, the scale of the threat posed to species by these types of injuries remains unclear, with vessel-strikes having proved notoriously difficult to monitor effectively. Bow-strikes are often only apparent through the phenomenon of bow-draping, whereby a struck animal remains attached to the bow of the vessel. In many instances, however, the carcass will slip from the bow and disappear as the vessel decelerates; hence the strike may often pass unnoticed.²⁴ Likewise, many individuals involved in collisions may not exhibit overt signs of trauma, yet are killed by internal injuries caused by vessel impact. With no obvious indication of vessel-strike, this may be discounted as a mortality factor and, accordingly, not officially recorded as such.²⁵

In some jurisdictions, legal requirements may also exacerbate the problem of under-reporting. Strict liability may be imposed for the killing of marine mammals under some national provisions; there is accordingly a clear practical disincentive to report accidental deaths. Other jurisdictions, such as the United States, require a formal record of vessel-strikes only where it appears clear that the animal has suffered a serious injury likely to cause death,²⁶ a veterinary assessment that the ordinary mariner is ill-equipped to make. More-

²¹ DW Laist and C Shaw, 'Preliminary Evidence that Boat Speed Restrictions Reduce Deaths of Florida Manatees' (2006) 22 *Marine Mammal Science* 472 at 472 to 473.

²² PA Work *et al.*, 'Influence of Small Vessel Operation and Propulsion System on Loggerhead Sea Turtle Injuries' (2010) 393 *Journal of Experimental Marine Biology and Ecology* 168 at 169.

²³ Clapham, note 7 above at 37.

²⁴ S Dolman *et al.*, *Vessel Collisions and Cetaceans: What Happens When They Don't Miss the Boat. A WDCS Science Report* (Chippenham: Whale and Dolphin Conservation Society, 2006) at 6 to 7.

²⁵ GK Silber, J Slutsky and S Bettridge, 'Hydrodynamics of a Ship/Whale Collision' (2010) 391 *Journal of Experimental Marine Biology and Ecology* 10, at 10.

²⁶ RS Wells *et al.*, 'Consequences of Injuries on Survival and Reproduction Rates of Common Bottlenose Dolphins (*Tursiops truncatus*) Along the West Coast of Florida' (2008) 24 *Marine Mammal Science* 1 at 2 to 3.

over, additional reporting problems may be created since the implications of vessel-strike injuries are not always fully appreciated – especially where a struck individual appears, in the immediate aftermath of the collision, to be relatively unscathed. Animals may initially survive a collision, only to succumb to their injuries or associated infections a considerable period of time after the original strike incident.²⁷ Where a struck individual does apparently survive, the long-term adverse effects of vessel-inflicted trauma, particularly concerning future reproductive capacity and impaired movement and feeding through injury, are little known.²⁸

The key factors behind the troubling rates of mortality and injury to marine mammals may, therefore, be summarised as follows: intensive shipping/boating activities in areas of critical importance to marine mammals; excessive vessel speed in particular habitats; a failure to notice the animals in question; and a general ignorance and under-reporting of the problem. Mitigation strategies are, therefore, most likely to be effective if they engender workable solutions to these particular difficulties. Of these factors, the first two are best regulated by coastal states acting in conjunction with the IMO, as the global standard-setting body for navigational matters. Notwithstanding some positive initiatives developed under the auspices of the IMO to date, the latter problems – observation, data collection and public awareness – are challenges that this body may be less able to address effectively, and could present clear opportunities for specific marine mammal regulators to posit a strong contribution. Indeed, there may ultimately be a strong circularity in the regulation of vessel-strikes, with the data generated through specialist management bodies informing subsequent navigational policies of key jurisdictions acting through the IMO.

3 MARINE MAMMALS, THE IMO AND THE INTERNATIONAL LAW OF NAVIGATION

The IMO has, since its establishment in 1948 in its original guise as the Intergovernmental Maritime Consultative Organization, acted as the key specialised agency of the UN responsible for the governance of maritime

²⁷ See R Campbell-Malone *et al.*, 'Gross and Histological Evidence of Sharp and Blunt Trauma in North Atlantic Right Whales (*Eubalaena glacialis*) Killed by Vessels' (2008) 39 *Journal of Zoo and Wildlife Medicine* 37. In one particularly stark case, a female right whale is known to have survived serious lacerations from a collision with a propeller, before dying some 14 years later when the wounds reopened as her abdomen expanded during her first pregnancy; Moore *et al.*, note 9 above, at 367.

²⁸ Wells, note 26 above, at 1.

transportation. It has oversight of navigational safety and the prevention of marine pollution from ships, especially through the elaboration of global standards for vessel design and operational practices. To this end the IMO plays an essentially facilitative role, providing a global forum to promote multilateral cooperation and to encourage ‘the general adoption of the highest practicable standards’ of shipping safety and marine environmental protection.²⁹ The various regulatory standards adopted by the IMO are not automatically binding upon its constituent member states. However, as noted below, a number of key obligations advanced under the LOSC in respect of marine environmental concerns and powers over navigational matters specifically mandate the engagement of coastal states with the ‘competent international organization’, a reference that is widely considered to mean the IMO.³⁰ Accordingly, as Harrison observes, ‘these so-called rules of reference serve to incorporate standards adopted by organizations such as the IMO into the legal framework of the Convention’.³¹

IMO policies are, therefore, of great importance in maintaining an effective balance between upholding freedom of navigation and advancing environmental protection through the periodic necessity to adopt rules and restrictions in respect of shipping traffic. This is especially significant since, as noted below, the power of coastal states to introduce restrictions on vessel movement – including measures of the type that are considered important in addressing vessel-mammal interactions – is markedly curtailed beyond the boundaries of the territorial sea. Indeed, many known vessel-strike hotspots are located outside the confines of the territorial sea, and purported future navigational restrictions will, therefore, require formal IMO endorsement to become operational.

In addition to commitments in respect of navigational safety and the protection of the marine environment, the LOSC prescribes particular obligations in relation to marine mammals. In the first instance, Article 64 addresses so-called ‘highly migratory species’, laying down an obligation to ‘cooperate directly or through appropriate international organizations with a view to ensuring conservation and promoting the objective of optimum utilization of such species throughout the region, both within and beyond the exclusive economic zone’. These species are listed in Annex I to the LOSC and include seven broad families of cetaceans, although this definition does not extend to

²⁹ Article 1 of the Convention on the International Maritime Organization: 289 UNTS 3.

³⁰ MH Nordquist (ed.), *United Nations Convention on the Law of the Sea: A Commentary*, vol IV (Dordrecht: Martinus Nijhoff, 1991) at 201.

³¹ J Harrison, *Making the Law of the Sea: A Study in the Development of International Law* (Cambridge: Cambridge University Press, 2011), at 166.

any other species of marine mammal for which vessel-strikes have been identified as a discernible conservation threat. More specifically, marine mammals in the EEZ are directly addressed under Article 65, which provides:

Nothing in this Part restricts the right of a coastal State or the competence of an international organization, as appropriate, to prohibit, limit or regulate the exploitation of marine mammals more strictly than provided for in this Part. States shall cooperate with a view to the conservation of marine mammals and in the case of cetaceans shall in particular work through the appropriate international organizations for their conservation, management and study.

This position applies *mutatis mutandis* to the high seas by virtue of Article 120 of the LOSC. These provisions are nevertheless considered to be afflicted by ‘bland phrasing and latent ambiguities’,³² and interpretations of the concepts of ‘working through’ and ‘appropriate organizations’ vary markedly between states.³³ There is little overarching guidance – nor, indeed, a commonly accepted philosophy – of what an ‘appropriate’ organisation may entail or the operational threshold by which this obligation may be fulfilled. This has led to acute political difficulties in the management of marine mammal resources, as states have sought to discharge these commitments through an array of different regulators, raising concerns over the potential application of varying conservation standards and priorities.³⁴ Nevertheless, while this continues to be one of the more polarised questions of interpretation of the LOSC, the engagement of the IMO with this issue would appear to be legally unproblematic. Given that the IMO is copiously designated throughout the LOSC as the ‘competent international organisation’ for vessel design and navigational standards, there can be little objective dissent to it being considered ‘appropriate’ for the purposes of regulating vessel-strikes of marine mammals. This position notwithstanding, the IMO has not traditionally exercised a strong role in nature conservation issues and has generally existed in isolation to the plethora of multilateral bodies exercising

³² PW Birnie, ‘Marine Mammals: Exploiting the Ambiguities of Article 65 of the Convention on the Law of the Sea and Related Provisions: Practice under the International Convention for the Regulation of Whaling’ in D Freestone, R Barnes and D Ong (eds), *The Law of the Sea: Progress and Prospects* (Oxford: Oxford University Press, 2006) at 278.

³³ TL MacDorman, ‘Canada and Whaling: An Analysis of Article 65 of the Law of the Sea Convention’ (1998) 29 *Ocean Development and International Law* 179; see also S Freeland and J Drysdale, ‘Co-Operation or Chaos? Article 65 of the United Nations Convention on the Law of the Sea and the Future of the International Whaling Commission’ (2005) 2 *Macquarie Journal of International and Comparative Environmental Law* 1.

³⁴ On this issue see DD Caron, ‘The International Whaling Commission and the North Atlantic Marine Mammal Commission: The Institutional Risks of Coercion in Consensual Structures’ (1995) 89 *American Journal of International Law* 154.

regulatory competences over a host of marine species. Instead, as noted below, while marine mammal management bodies have long sought to mitigate the impacts of international shipping on aquatic wildlife, they have had limited formal engagement with the IMO until relatively recently.

The vessel-strike issue has been raised intermittently within the IMO since 1997, where the United States first sought to raise awareness of the conservation problems posed to right whales in its EEZ. Subsequently, some eight separate navigational initiatives to mitigate vessel-strikes have been approved by the IMO,³⁵ with additional applications currently pending. Moreover, in July 2009, the IMO's Marine Environment Protection Committee (MEPC)³⁶ adopted a Guidance Document on this issue.³⁷ This was based on a US submission³⁸ tabled in 2008, which was subsequently circulated for comment and approved at MEPC 59, bolstered by a further paper introduced by Spain highlighting the particular problems posed by vessel-strikes in the Mediterranean.³⁹ The Guidance Document is not legally binding. Nevertheless, it constitutes a formal recognition by the UN that vessel-strikes pose an appreciable threat to shipping safety and to the conservation status of particular marine species, while establishing for the first time a series of recommended principles to be considered in framing national mitigation strategies.

The Guidance Document emphasises that navigational restrictions to mitigate vessel-strikes of cetaceans are not to be implemented lightly, with member governments first required to 'clearly identify the problem'.⁴⁰ This is likely to involve a considerable data collection effort in practice, including the identification of the specific species at risk, the times and areas at which such risks are most acute and the vessel traffic characteristics that contribute to this problem. The Guidance Document establishes seven key principles that the national authorities should 'take into account' in developing strategies to minimise vessel-strikes, namely that: maritime safety is of paramount concern; actions to achieve biological objectives should also take into account adverse impacts upon the shipping industry and other interests; documentation and best available

³⁵ GK Silber *et al.*, 'The Role of the International Maritime Organization in Reducing Vessel Threat to Whales: Process, Options, Action and Effectiveness' (2012) 36 *Marine Policy* 1221, at 1222.

³⁶ On the role of this body generally see L De La Fayette, 'The Marine Environmental Protection Committee: The Conjunction of the Law of the Sea and International Environmental Law' (2001) 16 *International Journal of Marine and Coastal Law* 155.

³⁷ *Guidance Document for Minimizing the Risk of Ship Strikes with Cetaceans*; Doc MEPC.1/Circ.674 of 31 July 2009 ('the Guidance Document').

³⁸ MEPC 58/18.

³⁹ MEPC 59/18.

⁴⁰ Guidance Document, note 37 above, at 2.

research should be gathered and analysed; measures should be based on the best available science and narrowly tailored to the times and areas in which the species is present; actions should be part of an overall strategy for the protection and recovery of an identified species; a range of possible solutions should be carefully analysed; and all actions should be reviewed periodically.⁴¹

On a national level, the IMO considers that a series of strategies could be appropriate to address vessel-cetacean interactions. These involve information gathering, which is considered 'critical to an effective ship strike reduction strategy',⁴² and should include monitoring activities, stakeholder engagement and the need to establish national mechanisms for storing the resultant data on vessel traffic and species movements. A further concern is education and outreach, including Notices to Mariners and awareness-raising campaigns, as well as further training for seafarers in marine mammal conservation. To date, this has been undertaken primarily by concerned nature conservation NGOs and research organisations, often acting in response to steering from biodiversity treaties. Notably, in April 2012, the US National Oceanographic and Atmospheric Administration developed a tailored module on vessel-strikes to be used in seafarer education courses,⁴³ which may help to raise awareness of this issue to some degree – at least among mariners trained in the United States. Otherwise, there is relatively little specific training on vessel-strikes within many jurisdictions that supply considerable numbers of seafarers. Accordingly, vessel-strike education, which appears to require a relatively modest investment of time and finance,⁴⁴ is largely at the discretion of individual shipping companies. It would appear that specialist training for mariners would be the favoured option for vessel operators seeking to institute strike mitigation policies, with the employment of specialist observers likely to increase costs significantly. As noted below, a concerted effort is currently being made by marine mammal bodies to engage with these enterprises to foster greater awareness of the problem and to encourage a wider participation in training programmes and other mitigation strategies. At present, it appears that education and training programmes have not generated the desired effect, with little evidence presented thus far that such initiatives have led to modifications in seafarer behaviour,⁴⁵ not least since

⁴¹ Ibid.

⁴² Ibid.

⁴³ See www.nero.noaa.gov/shipstrike/doc/mmem.html (last visited 1 June 2012).

⁴⁴ L. David, S. Alleaume and C. Guinet, 'Evaluation of the Potential Collision between Fin Whales and Maritime Traffic in the North-Western Mediterranean Sea in Summer, and Mitigation Solutions' (2011) 4 *Journal of Marine Animals and Their Ecology* 17, at 23.

⁴⁵ Silber *et al.*, note 35 above, at 1224.

mariners are busy with their general duties and may well be unable to simultaneously devote attention to the observation of marine mammals.

States may also consider funding for future technological developments to improve detection practices and hence improve the scope for avoiding large congregations of mammals. These developments remain in their relative infancy at present, although one notable initiative is the French-designed REPCET system that is used widely in the Mediterranean.⁴⁶ This programme uses an unobtrusive device to transmit sighting data from on-board observers, which is then stored centrally and relayed to other vessels equipped with this software to warn them of congregations of whales. It is currently used on a voluntary basis by particular shipping companies and its widespread use has been strongly endorsed by the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS),⁴⁷ which operates to protect cetaceans in these waters. It is likely that the REPCET software will be more widely applied in northern European waters in the near future. On a more localised basis, a free tablet computer and smartphone application, Whale Alert, was launched in April 2012 to assist mariners in tracking whale movements along the US east coast.⁴⁸

Finally, the Guidance Document establishes that operational measures may be considered, provided that they are 'fully consistent with international law'.⁴⁹ These may include routing and reporting measures or speed restrictions, which have been implemented in a small number of areas to date. On an international level, the IMO recommends enhanced cooperation between states and the coordination of policies with pertinent international organisations, for which the IWC and the Convention on the Conservation of Migratory Species of Wild Animals 1979 (CMS)⁵⁰ are explicitly identified.

3.1 Navigational rights and freedoms and the law of the sea

While the Guidance Document identifies a number of management initiatives that may be implemented by various regulatory authorities to address vessel-strikes – such as data collection programmes, public awareness campaigns, seafarer training and scientific cooperation – the main practical strategies required to minimise collisions will inevitably be advanced through navigational policies. In parallel to concerns over road safety on land, restrictions on

⁴⁶ See the REPCET website at www.repcet.com (last visited 1 June 2012).

⁴⁷ 2183 UNTS 303.

⁴⁸ See www.stellwagon.noaa.gov/protected/pdfs/whalealert_press.pdf (last visited 1 June 2012).

⁴⁹ *Ibid.*

⁵⁰ 1651 UNTS 333.

shipping traffic by means of speed limitations and/or the adjustment of shipping lanes are considered the most important navigation-based mitigation strategies for vessel-strikes. Nevertheless, navigational freedoms have long been zealously claimed and jealously guarded by states – a position largely upheld and reinforced by the LOSC – and coastal states do not have an unfettered discretion to impose restrictions on the movement of vessels. Notwithstanding a trend towards increased control over the movements of vessels in distress or laden with specific cargoes, coastal state jurisdiction over navigational concerns remains subject to clearly defined limits. Indeed, while powers to prescribe compulsory navigational requirements have been conferred on coastal states, these apply ‘only in respect of the less invasive types of traffic scheme, and may be made mandatory only where need is clearly demonstrated and with the specific approval of the International Maritime Organization ... granted on the basis of agreed and restrictive criteria; in addition, the responsible coastal states are given no enhanced enforcement powers’.⁵¹

With regard to the territorial sea of a coastal state, foreign shipping has a well-established right of innocent passage, insofar as such passage is not prejudicial to the peace, good order or security of that state.⁵² This is qualified, however, by Article 21(1), which permits the coastal state to adopt laws and regulations, provided that they are in conformity with the LOSC and other rules of international law, to govern innocent passage on the basis of, *inter alia*, the safety of navigation⁵³ and the conservation of the living resources of the sea,⁵⁴ both of which provide a pertinent legal foundation to address vessel-strikes of marine mammals. Thus the oversight of coastal navigation on this basis is clearly legitimate, provided that the resultant regulations do not affect the design, construction, manning or equipment of foreign ships, unless giving effect to generally accepted international rules and standards,⁵⁵ and that ‘due publicity’ is accorded to them.⁵⁶ A coastal state could, therefore, prescribe an acceptable navigational route of a vessel in these waters, but could not, for example, insist upon the mandatory recruitment of marine mammal observers as a prerequisite to passage through these waters.

⁵¹ G Plant, ‘The Relationship between International Navigation Rights and Environmental Protection: A Legal Analysis of Mandatory Ship Traffic Systems’ in H. Ringbom (ed.), *Competing Norms in the Law of Marine Environmental Protection: Focus on Ship Safety and Pollution Prevention* (London: Kluwer Law International, 1997) at 12.

⁵² Article 19(1) LOSC.

⁵³ Article 21(1)(a).

⁵⁴ Article 21(1)(b).

⁵⁵ Article 21(2).

⁵⁶ Article 21(3).

Any such laws and regulations introduced by the coastal state are mandatory and must be complied with by all vessels navigating in these waters.⁵⁷

In regulating innocent passage, a coastal state may formally require vessels to use sea-lanes and traffic separation schemes that it may designate or prescribe,⁵⁸ provided that it 'take[s] into account' *inter alia* the recommendations of the competent international organisation.⁵⁹ This is again subject to an overarching duty not to apply such policies in a manner so as to effectively deny or impair innocent passage or discriminate against foreign shipping.⁶⁰ Accordingly, the role of IMO in these waters is essentially recommendatory in nature, with the requirement to take its recommendations into account considered a means of promoting consultation between states that are affected by potential navigational restrictions.⁶¹ Notwithstanding the allusion in Article 22 that sea-lanes and traffic separation schemes be used and that such measures be founded on navigational safety requirements, it has been strongly argued that the wider context of the LOSC mandates a broader interpretation of this provision.⁶² Indeed, when read in conjunction with Article 21, as well as more general obligations in respect of environmental protection under Article 211, there appears to be considerable support for the assertion that the navigational tools available to a coastal state in regulating innocent passage need not be unduly confined to those expressly cited in Article 22(1). In the specific context of vessel-strikes, coastal states have indeed instituted a wider range of control mechanisms within their territorial seas, although traffic separation schemes and the adjustment of shipping lanes have been most widely applied, as noted below.

Finally, in relation to these waters, it should be observed that Article 24(2) prescribes a formal duty for a coastal state to give 'appropriate publicity to any danger to navigation, of which it has knowledge, within its territorial sea'. This obligation is most usually applied in the context of oceanographic hazards, such as submerged rocks, shallow waters and sandbanks, as well as problematic wrecks. This duty may nonetheless be tenably triggered where a discernible hazard to vessels by marine megafauna becomes apparent, especially within clearly identifiable locations or during predictable periods of intensive animal movement, such as migration.

⁵⁷ Article 21(4).

⁵⁸ Article 22(1).

⁵⁹ Article 22(3)(a). As noted above, this 'competent organisation' is construed as the IMO.

⁶⁰ Article 24.

⁶¹ Harrison, note 31 above, at 180.

⁶² J Roberts, 'Protecting Sensitive Marine Environments: The Role and Application of Ships' Routing Measures' (2005) 20 *International Journal of Marine and Coastal Law* 135 at 138.

Coastal states exercise jurisdiction over the marine environment within their Exclusive Economic Zone (EEZ), subject to the need to demonstrate 'due regard' to the rights and duties of other states.⁶³ Article 58 explicitly preserves freedom of navigation in these waters and the imposition by individual states of mandatory navigational measures is generally considered inappropriate,⁶⁴ aside from in exceptional and clearly defined circumstances. Accordingly, the scope for a coastal state to institute navigational restrictions to address vessel-strikes in its EEZ is significantly curtailed in comparison to the position in the territorial sea. To this extent, Article 211(1) prescribes a general power whereby states

acting through the competent international organisation or general diplomatic conference, shall establish rules and standards to prevent, reduce and control pollution of the marine environment from vessels and promote the adoption, in the same manner, where appropriate, of routeing systems designed to minimize the threat of accidents which may cause pollution of the marine environment.

This power is buttressed by Article 211(6), which prescribes a process in instances whereby the rules and standards cited above are deemed inadequate to meet the special circumstances of a clearly-defined area of a national EEZ. Here, a coastal state may direct a communication to the IMO on the basis *inter alia* of 'the particular character of its traffic', supported by scientific and technical evidence, that further laws and regulations are necessary to address a distinct environmental problem. The process is nonetheless rather protracted in practice – in addition to the time taken to generate the requisite data, the IMO is permitted to take up to 12 months to determine whether such conditions mandate additional restrictions, and there is a further lead-in period before any navigational controls may become operational.

There are three broad implications of Article 211 in the context of vessel-strikes. Firstly, unlike the position in respect of the territorial sea, whereby a coastal state may institute navigational restrictions provided account is taken of pertinent IMO recommendations, such measures may only be introduced in the EEZ with the express endorsement of the IMO in response to a specific application. Secondly, the basis for introducing routeing systems under Article 211 – the prevention of marine pollution – requires some interpretive creativity where applied to vessel-strikes. As noted below, despite some initial controversy it now appears that the mitigation of vessel-mammal interactions has become a broadly accepted ground for the introduction of routeing measures, even if it does not *stricto sensu* engage 'pollution' considerations. Finally, Article 211

⁶³ Article 56.

⁶⁴ G Plant, 'International Traffic Separation Schemes in the New Law of the Sea' (1985) 9 *Marine Policy* 134 at 145 to 146.

clearly establishes that routeing measures shall be ‘re-examined, from time to time as necessary’. Such measures are therefore not permanent fixtures and the coastal state that has solicited their introduction must accordingly remain diligent in its collection of data to demonstrate their ongoing necessity and utility. This latter caveat is also echoed within the principles advanced through IMO’s Guidance Document.⁶⁵

In areas beyond the confines of national jurisdiction, freedom of navigation remains paramount, as recognised under Article 87 of the LOSC. Article 211 nonetheless provides an overarching basis for routeing measures to be applied in these waters too, even if this currently remains a somewhat remote prospect at present. It is, however, likely to gain greater significance in future years as the coverage of protected areas on the high seas expands and the legal principles applicable thereto attain further maturity.⁶⁶ There is no requirement that an area of high seas for which routeing measures are advocated and pursued through the IMO must first be designated as a protected area. However, given that the initiation of navigational measures in these waters remains fundamentally dependent upon political will, it seems unlikely in practice that a sponsoring state will be forthcoming unless there is a pre-existing tradition of conservation interest in that particular location. Moreover, a significant proportion of those sites that are known to be both areas of critical habitat for marine mammals and are likely to be adversely affected by vessel traffic lie within the jurisdictional waters of states. Therefore, the application of routeing measures on the high seas is perhaps less of an operational priority at present, not least given that very few states have yet adopted measures within their own areas of jurisdiction.

Nevertheless, a growing number of sites that have been mooted as potential protected areas for cetaceans partially or fully incorporate areas of high seas.⁶⁷ Perhaps more than any other marine species, cetaceans are instrumental in generating the sustained political pressure necessary for the institution of protected areas and shipping restrictions. Accordingly, these locations may to a considerable extent be considered the most likely candidates within which navigational restrictions on the high seas may be advanced. Likewise, the congested jurisdictional geography of particular regions – notably the Mediterranean – has resulted in pockets of high seas in locations with a high density of both vessel traffic and marine mammals.

⁶⁵ Note 37 above, at 2.

⁶⁶ On this issue generally, see chapter 3 in this volume by Robin Churchill.

⁶⁷ For a broad summary of these areas see E Hoyt, *Marine Protected Areas for Whales, Dolphins and Porpoises: A World Handbook for Cetacean Habitat Conservation and Planning* (Abingdon: Earthscan, 2011) at 26 to 29.

Developments in one such area, the Ligurian Sea, have placed a high importance on the regulation of vessel traffic, although the role of the IMO has been somewhat more circumspect to date. In November 1999 an agreement was concluded between Italy, France and Monaco to create the Ligurian Sea Cetacean Sanctuary.⁶⁸ Under the agreement, which entered into force on 14 February 2002, an area of 96,000 square kilometres has been designated a sanctuary within which ‘the Parties shall protect all species of marine mammals’.⁶⁹ Popularly known as the Pelagos Sanctuary, some 53 per cent of this Marine Protected Area (MPA) incorporates areas of high seas.⁷⁰ This region is also globally notorious for high rates of vessel-strikes, especially by fast ferries, with some 82.2 per cent of all known collisions with fin whales registered within these waters.⁷¹ Accordingly, vessel-strike considerations form a significant component of national commitments under the agreement. Indeed, the agreement constitutes a rare example of a legal instrument in which vessel-strike issues are accorded such prominence, both on the high seas and within areas of national jurisdiction.

Within the Pelagos Sanctuary, parties undertake to prohibit the intentional disturbance of marine mammals⁷² and to ‘regulate the watching of marine mammals for touristic purposes’.⁷³ Particular concern is reserved for high-speed motorboat competitions within these waters, albeit subject to the rather hortatory commitment to ‘exchange views’ with the aim of regulating and ‘if appropriate’ prohibiting such events.⁷⁴ Any such ban would seem to be location-dependent, however, given that powers to institute navigational controls fluctuate considerably between zones of national jurisdiction, as outlined above. Important outreach projects are also prescribed in relation to vessel-strikes, with the parties required to ‘favour and encourage’ awareness campaigns ‘with particular emphasis on regulating the prevention of collision [*sic*] between vessels and marine mammals’.⁷⁵ This has been pursued largely through Italian-based institutions, with a dedicated campaign launched to

⁶⁸ Agreement on the Creation of a Mediterranean Sanctuary for Marine Mammals, 1999; reproduced at <http://www.tethys.org/sanctuary.htm> (last visited 1 June 2012). On the sanctuary initiative generally, see T Scovazzi, ‘The Mediterranean Marine Mammals Sanctuary’ (2001) 16 *International Journal of Marine and Coastal Law* 132; and G Notarbartolo di Sciara *et al.*, ‘The Pelagos Sanctuary for Mediterranean Marine Mammals’ (2008) 18 *Aquatic Conservation: Marine and Freshwater Ecosystems* 367.

⁶⁹ Article 2(2).

⁷⁰ Hoyt, note 67 above, at 24.

⁷¹ Panigada, note 14 above, at 1295.

⁷² Article 7(1) of the Agreement.

⁷³ Article 8.

⁷⁴ Article 9.

⁷⁵ Article 12(2)(b).

improve public awareness of this issue and to encourage slower speeds in key areas, especially by recreational craft.⁷⁶ To date, however, navigational developments to address vessel-strikes in these waters have proved rather limited, although various expert panels have recommended that the requisite approaches be made to the IMO.⁷⁷ Nevertheless, as noted by Churchill in chapter 3 of this volume, the legal framework that formally designates the Pelagos Sanctuary as a 'Specially Protected Area of Mediterranean Interest' appears to foresee a rather more limited relationship with the IMO than is perhaps considered by other regional actors.⁷⁸

The role of the IMO in these may ultimately become rather more significant in the near future. In July 2011, the Strait of Bonifacio, which incorporates the Pelagos area, was approved as a Particularly Sensitive Sea Area (PSSA).⁷⁹ The designation of an area as a PSSA provides a basis for the introduction of associated protection measures approved through the IMO, which include vessel routing and reporting measures and the designation of Areas To Be Avoided.⁸⁰ No such policies have yet been introduced for the Pelagos Sanctuary through the IMO, but the PSSA designation does at least provide a further layer of international commitments to protect these waters against anthropogenic activities harmful to marine mammals. Whether PSSA designation in and of itself is sufficient to facilitate targeted navigational measures to address vessel-strikes is somewhat debateable, however. Two other regions in which there is an appreciable risk of vessel-strikes have also been designated PSSAs – namely Western European Waters (2004) and the Canary Islands (2005) – and no such initiatives have as yet been advanced in these waters.

3.2 Vessel-strike mitigation responses: progress and prospects

To date, three coastal states have successfully instituted navigational adjustments and vessel-strike mitigation policies within their national waters. Thus

⁷⁶ The website www.collisioni.org provides information on marine mammal habitats, as well as reporting forms for collisions and striking publicity materials encouraging more responsible boating behaviour. This initiative has also been endorsed by the IWC and other key regional marine mammal bodies: E Remonato *et al.*, 'Ship Strikes with Cetaceans in the Mediterranean Sea: Assessment, Public Awareness and Mitigation Measures', poster presented at the 24th Conference of the European Cetacean Society (2010, on file with the author).

⁷⁷ In 2007, albeit in the context of ocean noise considerations, an expert workshop recommended *inter alia* the re-routing of particular shipping lanes: Hoyt, note 67 above, at 156.

⁷⁸ Churchill, note 66 above.

⁷⁹ *Designation of the Strait of Bonifacio as a Particularly Sensitive Sea Area*: Document MEPC 62/24/Add.1.

⁸⁰ Resolution A.982(24) Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas (PSSAs). On the application of these measures in PSSAs see Roberts, note 62 above.

far, these measures have been predominantly applied in North America, where the United States and Canada have sought to address the threats posed to populations of right whales in areas of high shipping density. More recently, a series of initiatives have been advanced in Spanish Mediterranean waters in response to concerns over the impacts of heavy vessel traffic in a compact geographical area that constitutes known areas of critical habitats for marine mammals. The experiences of these states is highly instructive and illustrates the potential conservation successes and improvements in shipping safety that may be advanced through the adoption of such measures – as well as practical challenges in securing compliance with what remain essentially voluntary standards.

As noted above, coastal states have fluctuating powers to impose navigational standards within their various zones of jurisdiction. A range of navigational measures may be pursued through the IMO to promote shipping safety and the protection of the marine environment.⁸¹ Thus far, the primary navigational policy to address vessel-strikes has been through the adoption of vessel-routing measures, most commonly in the form of Traffic Separation Schemes (TSS) and Areas To Be Avoided (ATBAs). This has been complemented by a pioneering initiative in the US, with the establishment of a Mandatory Ship Reporting System in areas of critical habitat for right whales.

Vessel routing measures

Vessel routing measures are generally considered to be the most effective navigational strategy to mitigate collisions with marine mammals. Current navigational rules consider a wide variety of vessel routing measures to be appropriate to promote navigational safety, of which the most relevant from the perspective of addressing vessel-mammal interactions are TSS programmes and ATBAs. A TSS is defined as ‘the separation of opposing streams of traffic by appropriate areas and by the establishment of traffic lanes’, while an ATBA comprises ‘an area within defined limits in which either navigation is particularly hazardous or it is exceptionally important to avoid casualties and which should be avoided by all ships, or certain classes of ship’.⁸²

⁸¹ For a helpful summary see CH Allen, *Farwell's Rules of the Nautical Road* (Annapolis, Maryland: Naval Institute Press, 2005) at 321 to 345.

⁸² IMO Resolution A.572 (14) of 20 November 1985 (as amended); ‘General Provisions on Ships’ Routing (‘the General Provisions’). On these initiatives generally see G Mapplebeck, ‘Management of Navigation through Vessel Traffic Services’ in DR Rothwell and S Bateman (eds), *Navigational Rights and Freedoms in the New Law of the Sea* (The Hague: Martinus Nijhoff, 2000) at 138 to 139.

The establishment of such measures in practice requires the approval of the IMO, especially in areas beyond the territorial sea and in relation to international straits. Notwithstanding the application of Article 21 of the LOSC and its conferral of powers upon the coastal state to adopt measures in its territorial sea, the IMO's General Provisions recommend that routing systems that lie solely within these waters be designed in accordance with IMO criteria and be submitted to the IMO for adoption.⁸³ This is supported by Article 22(3)(a), requiring the coastal state to take into account the recommendations of the competent international organisation. Likewise, Rules 1(d) and 10 of the International Regulations for Preventing Collisions at Sea 1972 reiterate that the IMO is competent to establish traffic separation schemes,⁸⁴ the mandatory nature of the Regulations is reinforced within the LOSC in Articles 21(4), 39(2)(a) and 94(4)(a). Moreover, states that have adopted the International Convention for the Safety of Life at Sea⁸⁵ recognise that the IMO is 'the only international body for designing guidelines, criteria and regulations on an international level for ships' routing systems'.⁸⁶ Regulation V/10 further stipulates that contracting governments 'shall' refer such proposals to the IMO for adoption. With SOLAS having been ratified by over 160 parties to date, very few coastal states would not be subject to this obligation. Where 'for whatever reason' a contracting government does not submit a routing system in its territorial sea to the IMO, the General Provisions require that it be brought clearly to the attention of mariners,⁸⁷ an obligation reinforced by Article 22(4) of the LOSC. Although the clear intention of this package of obligations is to promote full engagement with the IMO in the establishment of routing measures, national courts have nonetheless upheld the legitimacy of enforcement powers in respect of national TSS initiatives adopted outside the auspices of the Organization.⁸⁸

Within the EEZ, the General Provisions lay down an obligation to consult the IMO where a contracting government seeks to establish or amend a TSS in these waters.⁸⁹ Nevertheless, as Roberts and Tsamenyi observe, a degree of unilateral activity beyond the IMO may be necessary to fully comply with environmental obligations established in respect of the EEZ under Article 56,

⁸³ Paragraph 3.14.

⁸⁴ 1050 UNTS 16.

⁸⁵ 1184 UNTS 278 ('SOLAS').

⁸⁶ SOLAS Regulation V/10.

⁸⁷ Paragraphs 3.15 and 3.16. The requirement to submit such programmes for adoption through the IMO has the clear practical benefit of facilitating the effective dissemination of navigational routes and restrictions to mariners.

⁸⁸ Allen, note 81 above, at 325.

⁸⁹ Paragraph 3.8.

even where the IMO has endorsed navigational restrictions.⁹⁰ Such initiatives may include seasonal management areas, as well as speed restrictions for which 14 knots is considered the threshold of lethality for most whale species.⁹¹ Indeed, as noted below, compliance with recommended IMO speed limits to mitigate vessel-cetacean interactions has been rather poor; civil penalties may, therefore, provide a stronger spur towards compliance.⁹²

Finally, for straits used for international navigation, bordering states are entitled to propose vessel routing measures where appropriate.⁹³ However, in marked contrast to the position within the territorial sea, any such proposals must be referred to the competent international organisation – that is, the IMO – following which agreed measures may be implemented.⁹⁴ Thus far, vessel routing measures have been implemented in one international strait, the Strait of Gibraltar, as noted below.

To date, navigational measures to mitigate vessel-strikes of marine mammals have been almost universally introduced in the form of TSS initiatives. The first TSS application specifically to address vessel-strikes was introduced before the IMO by Canada in 2002 in relation to the Bay of Fundy. A TSS for this region had been established in June 1983 to promote shipping safety in these waters, but had the unintended consequence of partially displacing vessel traffic to an area of critical right whale habitat.⁹⁵ While the Canadian authorities had long been aware of the risks posed to right whales by vessels and had established a series of whale sanctuaries to this end, habitat management initiatives had been condemned as ‘weak or non-existent’,⁹⁶ since they comprised soft guidelines with the only possible enforcement mechanism arising in respect of the harassment of cetaceans in these waters.⁹⁷

⁹⁰ J Roberts and M Tsamenyi, ‘The Regulation of Navigation under International Law: A Tool for Protecting Sensitive Marine Environments’ in TM Ndiaye and R Wolfrum (eds), *Law of the Sea, Environmental Law and Settlement of Disputes: Liber Amicorum Judge Thomas A. Mensab* (Leiden: Martinus Nijhoff, 2007) 787, at 796.

⁹¹ Laist, note 8 above, at 39.

⁹² In January 2012, the United States issued a number of Notices of Violation and Assessment for speed violations, laying down fines of between \$11,500 and \$92,000 on the operators of three vessels. A number of active cases remain open: ‘Three Vessels Charged with Violating Right Whale Ship Strike Reduction Rule Pay Penalties’, www.noaaneews.noaa.gov/stories/2012/20120110_rightwhalepenalties.html (last visited 1 July 2012).

⁹³ Article 41(1) of the LOSC.

⁹⁴ Article 41(4).

⁹⁵ Silber *et al.*, note 35 above, at 1226.

⁹⁶ SS Elvin and CT Taggart, ‘Right Whales and Vessels in Canadian Waters’ (2008) 32 *Marine Policy* 379 at 324.

⁹⁷ D VanderZwaag, ‘Shipping and Marine Environmental Conservation in Canada: Rocking the Boat and Riding a Restless Sea’ in Rothwell and Bateman, note 82 above, at 223.

Following IMO approval, the northern tip of the existing TSS was adjusted eastwards by 3.9 nautical miles in July 2003, a modification that is considered to have facilitated a 62 per cent reduction in the risk of vessel-strikes in these waters.⁹⁸

Subsequently, TSS programmes have been introduced in Spanish and US waters. Two separate TSS initiatives have been established in southern Spain. In December 2006, a TSS was introduced in the Cabo de Gata region, primarily to address vessel-strikes of a number of protected species which included cetaceans and sea-turtles, as well as to mitigate the collision risks posed by a dramatic increase in bottom-trawling activities in the region. Concurrently, a TSS was introduced in the Strait of Gibraltar, although this development proved to be a rather more tortuous process than the Cabo de Gata initiative and one seemingly bedevilled by a lack of cooperation between the littoral states.⁹⁹ The Strait of Gibraltar TSS was accompanied by a recommended speed limit of 13 knots in these waters. Nevertheless, poor records of compliance have been recorded with these speed restrictions, which remain a set of voluntary standards: recent monitoring activities reported that only 45.5 per cent of cargo vessels, 15.6 per cent of ferries and 7.1 per cent of fast-ferries adhered to these recommendations.¹⁰⁰

In the United States, a pre-existing TSS in Boston has been adjusted twice, in 2007 and 2009, to respond to concerns over the scope for vessel-strikes of right whales in these waters.¹⁰¹ No subsequent TSS applications have been forthcoming from coastal states, although in July 2012 the Panamanian authorities announced at the annual IWC meeting a proposal to apply for four separate TSS programmes and appealed for support for its application within the relevant IMO committees.¹⁰² On a longer-term basis, TSS initiatives have also been mooted for Arctic waters, where reduced ice-coverage and a concomitant increase in vessel traffic have raised concerns over the

⁹⁸ ASM Vanderlaan *et al.*, 'Reducing the Risk of Lethal Encounters: Vessels and Right Whales in the Bay of Fundy and on the Scotian Shelf' (2008) 4 *Endangered Species Research* 283 at 283.

⁹⁹ Silber *et al.*, note 35 above, at 1227. An accompanying proposal for a vessel exclusion zone within the strait to protect sperm whales was rejected at this juncture.

¹⁰⁰ *Report of the Sixth Meeting of the Scientific Committee of ACCOBAMS* (Monaco: ACCOBAMS, 2010) at 13.

¹⁰¹ RL Merrick and TVN Cole, *Evaluation of Northern Right Whale Ship Strike Reduction Measures in the Great South Channel of Massachusetts* NOAA Technical Memorandum NMFS-NE-202 at 4 to 5.

¹⁰² *Proposal of the Republic of Panama for the Establishment of Traffic Separation Schemes and Prevention of Vessel Collisions with Whales*; Document IWC/64/CC23 Rev1.

susceptibility of critically endangered bowhead whales to vessel-strikes.¹⁰³ The United States has recently advocated route-planning initiatives to take into account the potentially increased exposure of Arctic marine mammals to vessels as part of the IMO's on-going efforts to address shipping safety and environmental considerations in the region.¹⁰⁴

In addition to the TSS initiatives, two separate ATBAs have been established in Canada and the United States respectively. In support of the TSS in the approaches to Boston, in December 2008 the IMO endorsed a US application for an ATBA within the Great South Channel, which is operational between April and July. Assuming that full compliance with the ATBA is achieved, the risk of vessel-strikes in these waters is projected to decrease by 78 per cent, while also funnelling shipping into the Boston TSS.¹⁰⁵ While ATBAs remain purely recommendatory in nature, the Canadian experience suggests that it can be a highly effective management tool. In May 2008, an ATBA was established within the Roseway Basin. This has proved to have had a considerable impact on vessel-strikes, with the risk of interactions with whales considered to have declined by up to 82 per cent as a result of voluntary practices.¹⁰⁶

It is not possible to project whether the high levels of compliance within the Roseway Basin ATBA will be replicated on a widespread basis, which would seem to be a clear criterion for the success of similar initiatives. In Georgia and Florida, compliance with voluntary routing measures for port approaches steadily increased over time to 96.2 per cent after three years of monitoring,¹⁰⁷ which suggests that in US waters at least there is cause for optimism that the Great South Channel ATBA may prove to be successful. Nonetheless, the practicalities of avoidance strategies do create considerable commercial dilemmas, which may impede compliance with voluntary standards. For instance, it is estimated that avoidance manoeuvres by container vessels in the Great South Channel will involve a 3.5 hour delay, rising to

¹⁰³ R Reeves *et al.*, 'Implications of Arctic Industrial Growth and Strategies to Mitigate Future Vessel and Fishing Gear Impacts on Bowhead Whales' (2012) 36 *Marine Policy* 454. On the future regulation of navigational matters in these waters see the chapter 1 in this volume by Tore Henriksen.

¹⁰⁴ IMO Sub-Committee on Ship Design and Equipment; Document DE 56/10/19.

¹⁰⁵ Merrick and Cole, note 101 above, at 3.

¹⁰⁶ AM Vanderlaan and CT Taggart, 'Efficacy of a Voluntary Area To Be Avoided to Reduce Risk of Lethal Vessel Strikes to Endangered Whales' (2010) 23 *Conservation Biology* 1467 at 1472.

¹⁰⁷ KM Lagueux *et al.*, 'Response by Vessel Operators to Protection Measures for Right Whales *Eubalaena glacialis* in the Southeast US Calving Ground' (2011) 14 *Endangered Species Research* 69 at 74.

5.5 hours for tankers.¹⁰⁸ The projected economic impacts of navigational restrictions on the east coast of the United States have been subject to little sustained appraisal. Based on analyses of the Canadian measures it appears that successful navigational restrictions will involve a delicate balancing act, requiring a high degree of participation from and cooperation by a wide range of stakeholders.¹⁰⁹

Vessel reporting measures

In 1994, following earlier deliberations within the IMO, SOLAS was amended to allow for coastal states to designate areas subject to mandatory ship reporting (MSR) systems.¹¹⁰ MSR systems entail a formal requirement for vessels to report to the national authorities on their movements through the area in question. They may be required to relay particular items of information and are intended to 'contribute to safety of life at sea, safety and efficacy of navigation and/or protection of the marine environment'.¹¹¹ Guidelines and criteria have been developed by the IMO for the establishment of MSR systems,¹¹² which may be applied to all vessels, to vessels of a certain category or those laden with particular cargoes – most often hazardous and noxious substances – as required by the coastal state. As is the case with vessel routing measures, the application of SOLAS means that proposed MSR systems will in practice require the approval of the IMO in order to become operational. Under Regulation V/11 of SOLAS, the IMO is again recognised as the 'only international body for developing guidelines, criteria and regulations on an international level for ship reporting systems'.

Although MSR systems are a relatively common feature of coastal navigation, an application for such an initiative with the specific aim of addressing vessel-strikes has been proposed and approved on only one occasion. In April 1998, the United States submitted a controversial application to the IMO to establish two MSR systems on its eastern coast: a permanent and continuous monitoring system encompassing the coast of New England and a more truncated system along the coastlines of Georgia and Florida, operational between

¹⁰⁸ J Firestone, 'Policy Considerations and Measures to Reduce the Likelihood of Vessel Collisions with Great Whales' (2009) 36 *Boston College Environmental Affairs Law Review* 389 at 398.

¹⁰⁹ AR Knowlton and MW Brown, 'Running the Gauntlet: Right Whales and Vessel Strikes' in Kraus and Rolland, note 9 above, at 427.

¹¹⁰ Ship reporting systems are addressed under Regulation V/11 of SOLAS.

¹¹¹ Regulation V/11: *ibid.*

¹¹² IMO Resolution A.851(20) of 2 December 1997: 'General Principles for Ship Reporting Systems and Ship Reporting Requirements, Including Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and/or Marine Pollutants'.

November and April, during periods of migration. The proposal provoked trenchant debate within the IMO's Sub-Committee on Safety of Navigation, since this was the application for a MSR system founded solely for the domestic protection of a single species. Although some support for this stance was evident, the United States was required to substantially dilute its original application, which had raised concerns that it was not sufficiently grounded in navigational considerations, that the proposed measures were too intrusive and that it would set an uncomfortable precedent facilitating the wholesale proliferation of such initiatives.¹¹³

In December 1998, the IMO endorsed the US proposal¹¹⁴ and the amended MSR system entered into effect on 1 July 1999. This programme, which applies to all ships of 300 gross tonnage or more, requires mariners to report their presence in clearly defined areas. Crews are then informed that they are entering an area of critical importance to right whales, that the species is highly endangered, that vessel-strikes pose a grave threat to the species and that such whales are present in the area. Mariners are advised to maintain a lookout for whales and to reduce speed near whales, in critical habitat, during conditions of poor visibility.

The MSR system has been subject to on-going review since its inception and a number of encouraging aspects of this programme have been reported, not least that many vessels chose to enter during daylight hours so as to have a better opportunity to sight whales before a collision occurred.¹¹⁵ The MSR system has appeared to have engendered a fuller appreciation of the vessel-strike issue on the part of shipping companies operating within US waters. Nevertheless, there are considerable limitations in this approach, not least since vessels under the 300 gross tonnage limit for mandatory reporting requirements are also involved in vessel-strikes.¹¹⁶ There are also indications that many elements of the shipping industry may simply be following the path of least resistance. Although there has been considerable compliance with recommended routing measures in the approaches to major ports, there have been markedly lower levels of compliance with recommended speed restrictions. Indeed, in the immediate years following the implementation of the

¹¹³ On the turbulent passage of this proposal through the IMO see JP Luster, 'The International Maritime Organization's New Mandatory Ship Reporting System for the Northern Right Whale's Critical Habitat: A Legitimate Approach to Strengthening the Endangered Species Act?' (1999) 46 *Naval Law Review* 153 at 163 to 168.

¹¹⁴ Resolution MSC.85(70).

¹¹⁵ GK Silber *et al.*, *Ship Traffic Patterns in Right Whale Critical Habitat: Year One of the Mandatory Reporting System* (Washington: NOAA, 2002) at 8.

¹¹⁶ Merrick and Cole, note 101 above, at 5.

programme, some 55 per cent of vessels traversing the MSR areas continued to travel at over 14 knots, despite clear information that this amplified the risk of a fatal vessel-strike.¹¹⁷ This appears to be particularly pronounced within the southern areas of the MSR scheme, where vessels have been monitored at significantly higher speeds than in the northern segment,¹¹⁸ while compliance with voluntary speed restrictions in Georgia and Florida is as low as 15 per cent of all vessels in a busy shipping area.¹¹⁹ Despite the concerns raised during the approval process over their potential proliferation, the US MSR system remains the sole example of a reporting programme specifically designed to address vessel-strikes. While no further proposals appear likely to be submitted in the mid-term future, the application of additional MSR schemes has nonetheless been advocated as a management tool for other locations, subject to further research.¹²⁰

4 COORDINATION WITH INTERNATIONAL MANAGEMENT FORA

The IMO-endorsed navigational measures outlined above constitute a substantial component of successful vessel-strike mitigation policies. However, as noted by the Guidance Document, there is also a significant role for marine mammal management fora in framing effective responses to this problem. Indeed, a considerable volume of work has been undertaken under the auspices of the IWC and the CMS, the two main organisations expressly identified within the Guidance Document, with vessel-strikes having occupied an increasingly prominent position upon their respective agendas in recent years. These bodies cannot establish restrictions on vessel movements. They are, however, likely to play a key role in generating the sustained levels of data required for such restrictions to be introduced and maintained. Their scientific initiatives also shed considerable light on the scale of the problem in particular areas and may also assist in generating the necessary political enthusiasm on the part of their constituent parties to consider further applications to the IMO for navigation-related mitigation strategies. They also have a vital role to play in raising public awareness of the problem, publicising the IMO initiatives,

¹¹⁷ *Ibid.* at 9.

¹¹⁸ *Ibid.* at 7.

¹¹⁹ Lagueux *et al.*, note 107 above, at 74. This compares to a compliance rate of 75 per cent with mandatory speed restrictions in these waters.

¹²⁰ Van Waerebeek, note 16 above, at 64; see also the discussion of ACCOBAMS policies below.

facilitating data-exchange and scientific collaboration, engaging with relevant stakeholders and developing additional mitigation strategies.

4.1 The International Whaling Commission

The International Convention for the Regulation of Whaling¹²¹ was opened for signature in December 1946 and formally entered into force on 10 November 1948, establishing the legal foundations for the inauguration of the International Whaling Commission (IWC) as the global regulatory body responsible for the husbandry of whale stocks. The IWC, which entered into practical operation in May 1949, was duly charged with implementing the twin objectives of the ICRW, stated as being ‘to provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry’.¹²² The IWC has subsequently become a controversial body, not least given the implications of historical mismanagement that resulted in wholesale over-hunting and significant damage to a number of stocks of cetaceans.¹²³ In more recent years, the IWC has suffered from sharp internal divisions, as the whaling question has become heavily politicised.¹²⁴ An open-ended moratorium on commercial whaling was instituted in 1982, effective from the 1985/6 hunting seasons onwards. Consideration of the management difficulties of the IWC lies outside the scope of this chapter. However, it should be observed that – not without controversy – the IWC has placed a stronger emphasis in recent years upon addressing wider anthropogenic threats to cetaceans beyond directed hunting, for which vessel-strikes has attracted further attention.

The IWC meets on an annual basis, supplemented by occasional special meetings. In performing its functions, it may establish ‘such committees as it

¹²¹ 161 UNTS 72 (the ‘ICRW’).

¹²² Preamble: eighth recital. For a full appraisal of the operation of the IWC, see PW Birnie, *The International Regulation of Whaling: From Conservation of Whaling to the Conservation of Whales and the Regulation of Whale-Watching* (New York: Oceana Publications, 1985); see also A Gillespie, *Whaling Diplomacy: Defining Issues in International Environmental Law* (Cheltenham: Edward Elgar, 2005).

¹²³ For a full outline of IWC management practices and the plight of whale stocks see JN Tønnessen and AO Johnsen, *The History of Modern Whaling* (London: C. Hurst & Co, 1982).

¹²⁴ See, especially, PJ Stoett, *The International Politics of Whaling* (Vancouver: University of British Columbia Press, 1997); C. Epstein, *The Power of Words in International Relations: Birth of an Anti-Whaling Discourse* (Cambridge, Massachusetts: MIT Press, 2008); A D’Amato and SK Chopra, ‘Whales: Their Emerging Right to Life’ (1991) 85 *American Journal of International Law* 21; and H Sigvaldsson, ‘The International Whaling Commission: The Transition from a “Whaling Club” to a “Preservation Club”’ (1996) 31 *Cooperation and Conflict* 311.

considers desirable to perform such functions as it may authorize'.¹²⁵ A number of operational committees have been established to date,¹²⁶ of which the Scientific Committee is by some distance the most important and is widely considered to be a leading global forum for debate and discourse on all aspects of cetacean science.¹²⁷ Moreover, in 2003 a Conservation Committee was established by the IWC,¹²⁸ which has sought to bolster the work of the Scientific Committee and to explore further synergies with allied institutions. Concerns over vessel-strikes have been raised in both committees, and have received special attention under the auspices of the Conservation Committee since its inception, as noted below.

Although traditionally dominated by the management of commercial hunting quotas, the IWC has explicitly acknowledged that 'whales in the 21st Century face a wider range of threats than those envisaged when the IWC was concluded in 1946'.¹²⁹ These wider anthropogenic factors have been primarily examined through the Scientific Committee, and, more specifically, a Standing Working Group on Environmental Concerns (SWGEC), established in 1996. The Scientific Committee has considered reports regarding habitat-related issues since 1972, in the wake of the UN Conference on the Human Environment. However, concerns over wider environmental pressures on cetaceans were first explicitly recognised within IWC Resolutions in 1980, with a broad call for parties to 'take every possible measure to ensure that degradation of the marine environment, resulting in damage to whale populations and subsequent harm to affected peoples, does not occur'.¹³⁰ Nevertheless, although a further Resolution in the following meeting observed the 'serious threat' to whale stocks from 'increasing levels of heavy metals, PCBs and other organochlorides detected in cetaceans',¹³¹ no further substantive Resolution addressing wider ecological pressures was adopted until 1992, at which point the

¹²⁵ Article III(4).

¹²⁶ For a discussion of the main IWC committee structure see MC Maffei, 'The International Convention for the Regulation of Whaling' (1997) 12 *International Journal of Marine and Coastal Law* 287 at 292.

¹²⁷ For a detailed discussion of the history and operation of the Scientific Committee see M. Heazle, *Scientific Uncertainty and the Politics of Whaling* (Seattle: University of Washington Press, 2006).

¹²⁸ Resolution 2003-1: The Berlin Initiative on Strengthening the Conservation Agenda of the International Whaling Commission. On these developments see WCG Burns, 'The Berlin Initiative on Strengthening the Conservation Agenda of the International Whaling Commission: Toward a New Era for Cetaceans' (2004) 13 *Review of European Community and International Environmental Law* 72.

¹²⁹ Resolution 2007-3: Resolution on the Non-Lethal Use of Cetaceans.

¹³⁰ Resolution 1980-10: Resolution on the Habitat of Whales and the Marine Environment.

¹³¹ Resolution 1981-7: Resolution Relating to Pollutants in Whales.

Scientific Committee established the impact of environmental changes on whale stocks as a regular agenda item.¹³²

To date, the IWC has yet to centrally adopt a specific Resolution on the issue of vessel strikes. Instead, this problem has been noted residually in the context of wider attention accorded to anthropogenic pressures, for which the IWC has adopted an incremental series of Resolutions. In 1994, the Scientific Committee had identified global warming, ozone depletion, pollution, direct and indirect effects of fisheries and noise as key factors to be considered in the context of cetaceans and encouraged parties to cooperate to provide pertinent information on these issues.¹³³ Within these priorities, however, concerns over the impacts of shipping on cetaceans were essentially limited to noise and chemical pollution – perhaps unsurprisingly, given that vessel-strikes were only beginning to be raised as a specific concern by researchers at the material time.

In 1996, SWGEC was formally established and the Scientific Committee directed to ‘consider, and as appropriate act on’ items requiring additional examination, which were listed as including ‘the impact of noise; anthropogenic environmental degradation; and the direct and indirect effect of fisheries’, with a view towards developing a non-lethal research programme to assess the impacts of environmental changes upon cetaceans.¹³⁴ In 1997, following the first two intersessional meetings of SWGEC, eight ‘topics of particular importance’ were identified, expanding the original list to encompass ‘climate/environmental change, ozone depletion and UV-B radiation, chemical pollution, impact of noise, physical and biological habitat degradation, effects of fisheries, Arctic issues, disease and mortality events’.¹³⁵ This latter consideration did at least provide a basis to examine ‘non-natural mortalities’ which would technically include the instances of vessel-strike. Further scope for evaluating the impacts of vessel-strikes was forthcoming in 1998, where the Scientific Committee was instructed to calculate future catch limits by incorporating ‘all human-induced mortalities that are known or can be reasonably estimated, other than commercial catches’.¹³⁶ Losses through vessel-strikes ought, therefore, to be directly considered in establishing the parameters of the Revised Management Scheme (‘RMS’), which will form the basis of quota calculations if and when the current moratorium on commercial hunting is rescinded by the IWC.

¹³² Resolution 1992-2: Resolution on the Need for Research on the Environment and Whale Stocks in the Antarctic Region.

¹³³ Resolution 1994-13: Resolution on Research on the Environmental and Whale Stocks.

¹³⁴ Resolution 1996-8: Resolution on Environmental Change and Cetaceans.

¹³⁵ Resolution 1997-7: Resolution on Environmental Change and Cetaceans.

¹³⁶ Resolution 1998-2: Resolution on Total Catches over Time.

Although a Resolution specifically addressing vessel-strike has not as yet been adopted by the IWC, the phenomenon was clearly acknowledged as a threat to specific stocks of whales in 1999 and 2000. Vessel-strikes, as with any other form of anthropogenic removal, can be highly damaging, even in relatively superficial numbers, to stocks of cetaceans that are especially depleted.¹³⁷ In 1999, a Resolution explicitly noted *inter alia* the potentially grave effects of vessel-strike on critically endangered species.¹³⁸ Although the Resolution was arguably focused more on by-catches and directed hunting, it nonetheless called on the parties and the Scientific Committee to study the strike issue further and take appropriate regulatory steps. Latterly, in 2000, the IWC raised concerns over right whale populations, noting that ‘the two major causes of human-induced mortality for this species are ship strikes and entanglement in fishing nets and gear’.¹³⁹ Moreover, the Resolution commended the developments within the IMO on the US mandatory ship reporting system (as outlined above) and encouraged parties with an interest in navigation in these waters to ‘to pursue actively, practicable actions to reduce as far as possible ship strikes on right whales’.

Vessel-strikes have not been ostensibly cited as an individual cause for concern within the wider IWC Resolutions since 2000.¹⁴⁰ Conversely, however, this issue received a fresh impetus in recent years through the work of the IWC’s Conservation Committee. This body was established designed primarily to assist the IWC ‘to effectively organise its future work in the pursuit of its objective by devising an appropriate agenda that places special emphasis on its benefits to conservation’.¹⁴¹ To this end, the Conservation Committee is primarily tasked with developing synergies with other pertinent organisations and to reviewing ‘appropriate scientific research items’.¹⁴² The Conservation

¹³⁷ RR Reeves, BD Smith, EA Crespo and G Notarbartolo di Sciarra, *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World’s Cetaceans* (Gland: IUCN, 2003) at 16 to 17.

¹³⁸ Resolution 1999-7: Resolution on Small Populations of Highly Endangered Whales. The populations in question were listed as bowhead stocks in Okhotsk Sea and Spitsbergen and Eastern Canadian Arctic; Western North Pacific stocks of grey whales; Northern right whales; and blue whales.

¹³⁹ Resolution 2000-8: Resolution on Western North Atlantic Right Whales.

¹⁴⁰ Vessel-strikes have, however, been cited as a significant threat to grey whales in a recent IWC-sponsored conservation plan for grey whales, for which participants are to identify areas of overlap between migratory routes and high levels of ship traffic ‘and to establish precautionary mitigation measures there’. This action point has been accorded a ‘moderate’ priority: *Draft Conservation Plan for Western North Pacific Grey Whales (Eschrichtius robustus)*, Document SC/62/BRG24, at 16.

¹⁴¹ Resolution 2003-1: The Berlin Initiative on Strengthening the Conservation Agenda of the International Whaling Commission.

¹⁴² Resolution 2003-1, *ibid*.

Committee exhibits considerable potential in this respect and its work in relation to vessel-strikes provides a degree of optimism that it can make a positive contribution to the work of the IWC. This body was a somewhat controversial adjunct to the structure of the IWC, due rather less to its specific function as a supplementary research and policy-development group, than to the politics of the Commission and the perceived preservationist implications of the (undefined) term 'conservation'.¹⁴³

Following the practice of SWGEC, which aims to 'focus on one or two priority topics for consideration at each meeting in order to ensure maximum effectiveness',¹⁴⁴ the Conservation Committee also adopts a streamlined working agenda. At the inaugural meeting of the Conservation Committee in 2004, a series of items of 'common interest' were identified, with ship-strikes and chemical pollution considered to be the issues requiring immediate focus.¹⁴⁵ In 2005 a Ship Strikes Working Group ('SSWG') was established under the auspices of the Conservation Committee,¹⁴⁶ which can be seen to have revitalised efforts to address the problem of vessel-strike in three key ways.

Firstly, the activities of the SSWG and wider Conservation Committee have been instrumental in the official recognition of the IWC before the IMO. Indeed, commentators had been critical of the lack of collaborative practices between the two bodies, with attempts to disseminate Resolution 2000-8 within the IMO by the IWC Secretariat rejected due to the absence of a formal cooperative arrangement.¹⁴⁷ This appears to have been based on a misunderstanding by the IWC of the rules of procedure of the IMO, under which documents may not be unilaterally circulated by an unaccredited organisation.

¹⁴³ Indeed, early meetings of the Committee were somewhat uneasy, with some parties viewing this body as a vehicle to further advance protectionist claims. Of the main pro-whaling members of the IWC, Japan has yet to attend a meeting of the Conservation Committee, while Iceland and Norway adopted an initially cautious line towards the work of the Committee.

¹⁴⁴ Resolution 1999-5: Resolution on the Funding of High Priority Scientific Research.

¹⁴⁵ *Report of the Conservation Committee* at 3; reproduced as Annex H of the *Chair's Report of the Fifty-Sixth Annual Meeting of the International Whaling Commission* (Cambridge: IWC, 2004). The full range of concerns comprised endangered species and populations; human impacts; habitat protection; whalewatching; reporting systems for strandings, entanglements and by-catches; and legal and regulatory arrangements for cetacean conservation.

¹⁴⁶ *Report of the Conservation Committee* at 2; reproduced as Annex G of the *Chair's Report of the Fifty-Eighth Annual Meeting of the International Whaling Commission* (Cambridge: IWC, 2006).

¹⁴⁷ See especially P Birnie, 'The Framework for Conservation of Whales and Other Cetaceans as Components of Marine Biodiversity' in WCG Burns and A Gillespie (eds), *The Future of Cetaceans in a Changing World* (New York: Transnational Publishers, 2003), at 136 to 137. The Resolution was ultimately submitted to the IMO through Sweden, a mutual participant in both bodies.

This is in marked contrast to the less formal practices of the biodiversity treaties with which the IWC is more accustomed to working, and which are generally rather more welcoming of unsolicited materials and reports from bodies engaged on allied themes.¹⁴⁸ In any event, given the longstanding concerns expressed within the IWC over the conservation threats posed to cetaceans through a variety of shipping activities, its historical lack of official collaboration with the IMO is striking, especially given the considerable efforts undertaken to foster links with other bodies on the part of both organisations. The SSWG identified this position as an impediment to meaningful progress on the vessel-strike issue and, through the Conservation Committee, recommended that the IWC Secretariat explore the development of a cooperative agreement with the IMO.¹⁴⁹ A draft Agreement of Cooperation was duly developed and this arrangement was formally approved at the IMO General Assembly in 2009. This formalised basis for cooperation presents opportunities for the mitigation of an array of ship-source impacts upon the cetacean environment, not only in the specific context of vessel-strikes, but also in relation to wider factors such as anthropogenic noise.

Secondly, the SSWG has provided a global focal point for the discussion of all aspects of the vessel-strike problem, ranging from scientific observations to legislative developments across a range of IWC parties. This has engendered a greater appreciation of the need to advance additional policies in individual jurisdictions, as the various parties have reported on national developments and shared information on mitigation strategies. Likewise, and allied to the emergence of stronger relations with the IMO, the SSWG has also provided a clear focal point for collaborative work with other organisations. A particular example of this is the establishment of a joint workshop with ACCOBAMS, convened in September 2010.¹⁵⁰ These developments have been accompanied by a further encouraging sign of progress, in the form of additional funding for vessel-strike projects donated by a number of parties. This financial support has assisted in additional initiatives, primarily connected with data collection and collation. It also somewhat dispels the pessimistic (although not unreasonable) early predictions that the Conservation Committee would struggle to generate vital research monies.¹⁵¹

¹⁴⁸ On this issue generally see R Caddell, 'The Integration of Multilateral Environmental Agreements: Lessons from the Biodiversity-Related Conventions' (2012) 22 *Yearbook of International Environmental Law* 1 at 21 to 32.

¹⁴⁹ SSWG: *Second Progress Report to the Conservation Committee* (Cambridge: IWC, 2007) at 2.

¹⁵⁰ *Report of the Conservation Committee*; Document IWC/61/Rep5 at 5.

¹⁵¹ Burns, note 128 above, at 82 (noting that '[t]he IWC's efforts to conduct critical cetacean research have been hobbled by the failure of its members to provide adequate funding').

Thirdly, and perhaps most significantly, the SSWG has also provided a much-needed global forum for research and the submission of data. One of the key difficulties experienced to date in the development of overarching policies has been the lack of a central repository for strike data. Instead, statistics and incident records have often remained scattered across a variety of documents, with varying degrees of public accessibility, or have otherwise languished unpublished and unread in archives. An immediate priority of the SSWG was, therefore, to establish a central database on ship-strikes.¹⁵² A database has been duly developed, accessible via the IWC institutional website, and is open to receive information on strikes from a variety of sources and actors.¹⁵³ Regrettably, individual mariners initially proved slow to upload strike data,¹⁵⁴ which appears to have been primarily utilised by researchers, government agencies and NGOs. Accordingly, the promotion of this initiative to smaller maritime operators may need to become a key aspect of IWC outreach policies if the database is to achieve its stated aims. Nonetheless, a considerable volume of data is starting to emerge on both historical and contemporary incidents, revealing a clearer picture of the risks posed by vessel-strikes to cetaceans.

Moreover, the database also generates important information on the risks posed to navigational safety, an issue that has been rather overlooked in the (largely conservation-orientated) scientific literature. From a shipping perspective, the database has also illuminated the high costs of cetacean-strikes to individual vessels, and the serious injuries that may be sustained by the passengers and crew in a collision. The need for effective mitigation measures is therefore not simply an abstract conservation problem, but is also firmly in the commercial interests of shipping operators and their insurers. This position may ultimately present considerable opportunities for collaboration between shipping companies and scientific researchers, to the benefit of both constituencies.

Beyond these primary advantages, the SSWG represents considerable promise for future initiatives addressing vessel-strikes, with aspirations to significantly develop the knowledge base on both the scale of the problem and the effectiveness of mitigation strategies. It is hoped that research projects will continue, especially in locations and for species that have been

¹⁵² *Second Progress Report*, note 149 above, at 4.

¹⁵³ The IWC Ship Strikes database is accessible at <http://data.iwcoffice.org/whalestrike/> (last visited 1 June 2012).

¹⁵⁴ *SSWG: Fifth Progress Report to the Conservation Committee* (Cambridge: IWC, 2010) at 3.

traditionally under-studied, provided that the SSWG can continue to generate the requisite funding to underwrite such activities. This is a considerable assumption, however. The attention of the Conservation Committee, by its inherent nature, will inevitably shift towards anthropogenic activities that are equally deserving of further investigation, while there is no guarantee that the current rates of donation will continue in the mid- to long-term future.

Likewise, the SSWG intends that its database – which is currently dominated by submissions from current IWC parties, along with a very small number of non-parties that have undertaken substantial research on this issue, notably Canada – will become a global enterprise, with the Scientific Committee acting as a central repository of all such data. There is a clear case for this. The IMO's Guidance Document expressly endorses this project and appeals to states to provide national data on vessel-strikes to the IWC.¹⁵⁵ The IWC's Scientific Committee has long been regarded as the pre-eminent international body on all aspects of cetacean science, to which most other scientific fora largely defer on whale-related advisory matters.¹⁵⁶ Moreover, other management organisations appear to be comparatively poorly placed to perform this essential task. The CMS lacks participation from among the major shipping nations, while the IMO 'does not have a scientific committee nor a tradition of managing similar databases'.¹⁵⁷ It is acknowledged, however, that there are ongoing practical challenges to IWC monitoring, notwithstanding its clear advantages as a central repository of data. Indeed, 'not all maritime nations are IWC Parties and non-members may not be able, or willing, to contribute with vessel strike data', unlike the case with the IMO.¹⁵⁸ Provided these difficulties can be overcome, by persuading recalcitrant states to volunteer this information to the Commission directly or through the IMO, the scientific expertise of the IWC and its stated remit and clear engagement with this issue render it a natural choice as a global repository for data and policy advice. In return, the clearer identification of the scale of vessel-strikes in regions and individual states through these IWC initiatives – and the accompanying political attention afforded to the issue – could serve to prompt the pursuit of further navigational measures through the IMO, as evidenced by recent developments in Panama.

¹⁵⁵ Note 37 above, at 5.

¹⁵⁶ See Gillespie, note 122 above, at 330 to 345.

¹⁵⁷ K Van Waerebeek and R Leaper, *Report from the IWC Vessel Strike Data Standardization Group*, Document SC/59/BC12, at 2.

¹⁵⁸ *Ibid.*

4.2 The Convention on Migratory Species of Wild Animals

In addition to the policies adopted under the auspices of both the IMO and the IWC, the CMS also has a significant role to play in the regulation of vessel-strikes.¹⁵⁹ As the experience of the North American initiatives indicates, a major threat posed to marine mammals by vessels occurs during periods of migration. Accordingly, with avoidance techniques largely viewed as the most effective mitigation strategy in respect of vessel-strikes, a clear knowledge of and protection measures for migratory routes and pathways is necessary. Such a platform is provided under the auspices of the CMS, which addresses the specific conservation needs of migratory species.

Parties to the CMS agree to take action to avoid any migratory species from becoming endangered¹⁶⁰ and to promote, cooperate in and support research relating to migratory species.¹⁶¹ The CMS draws a distinction between species identified as ‘endangered’ and those considered to have an ‘unfavourable conservation status’, with differing obligations and policies prescribed in relation to each category. To this end, following the practice of other international biodiversity treaties, such species are clearly identified and listed the Convention, with ‘endangered’ species assigned to Appendix I and those with an ‘unfavourable conservation status’ to Appendix II. Parties are to ‘endeavour to provide immediate protection’ for Appendix I species,¹⁶² while for those species listed in Appendix II, they are to endeavour to conclude a series of subsidiary instruments to address the long-term conservation and management needs of these animals.¹⁶³

Three broad objectives are prescribed for Range States of species listed in Appendix I. Most notably, in the context of vessel-strikes, parties are committed to prevent, remove, compensate for or minimise, as appropriate, the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species; and, ‘to the extent feasible and appropriate’, to

¹⁵⁹ For a full outline of the CMS see R Caddell, ‘International Law and the Protection of Migratory Wildlife: An Appraisal of Twenty-Five Years of the Bonn Convention’ (2005) 16 *Colorado Journal of International Environmental Law and Policy* 113; see also R Caddell, ‘Biodiversity Loss and the Prospects for International Cooperation: EU Law and the Conservation of Migratory Species of Wild Animals’ (2008) 8 *Yearbook of European Environmental Law* 218 and N Matz, ‘Chaos or Coherence? Implementing and Enforcing the Conservation of Migratory Species through Various Legal Instruments’ (2005) 65 *Zeitschrift für ausländisches öffentliches Recht und Völkerrecht* 197.

¹⁶⁰ Article II(2).

¹⁶¹ Article II(3)(a).

¹⁶² Article II(3)(b).

¹⁶³ Article II(3)(c).

prevent, reduce or control factors that are endangering or are likely to further endanger the species.¹⁶⁴ This would seemingly provide an additional spur for coastal states to consider applying to the IMO to institute the pertinent navigational policies outlined above where there was a clear indication that the migratory routes of Appendix I species were imperilled in this way. In addition to these requirements, the Conference of the Parties (COP) may recommend 'further measures considered appropriate to benefit the species' which are to be taken by the relevant Range States in relation to such animals.¹⁶⁵

Appendix II lists species with an 'unfavourable conservation status'. For Appendix II species, the parties undertake to develop 'international agreements for their conservation and management'.¹⁶⁶ Two types of instrument are envisaged for species listed in Appendix II, namely an AGREEMENT established under Article IV(3) of the Convention, or an Agreement concluded pursuant to Article IV(4).¹⁶⁷ There is also scope for the adoption of non-binding measures, typically in the form of Memoranda of Understanding,¹⁶⁸ the conclusion of which has been viewed as a regulatory priority by the CMS institutions given the financial, technical and personnel constraints of the current regime.¹⁶⁹ A number of subsidiary instruments, of varying legal strength, have been concluded in respect of marine mammals, some of which have adopted distinct policies on vessel strikes, as outlined below.

On an institutional level, marine mammals – and especially cetaceans – have received sustained attention within the COP, the primary decision-making forum of the CMS. The COP has adopted numerous Resolutions on conservation threats to cetaceans, especially pertaining to by-catches and ocean noise, but has not yet advanced a specific Resolution on the issue of vessel-strikes. However, of particular significance to the vessel-strike issue is the adoption at the Eighth COP of a specific Resolution on anthropogenic impacts on cetaceans,¹⁷⁰ which has set the general tone for cetacean-related initiatives

¹⁶⁴ Article III(4).

¹⁶⁵ Article III(6).

¹⁶⁶ Article IV(1).

¹⁶⁷ The term AGREEMENT is emphasised in capital letters in order to distinguish this type of instrument from the kind provided for under Article IV(4); Resolution 2.6: Implementation of Articles IV and V of the Convention, adopted at the Second Conference of the Parties in October 1989.

¹⁶⁸ On the role of such instruments within the CMS umbrella see C Shine, 'Selected Agreements Concluded Pursuant to the Convention on the Conservation of Migratory Species of Wild Animals' in D Shelton (ed.), *Commitment and Compliance: The Role of Non-Binding Norms in the International Legal System* (Oxford: Oxford University Press, 2003), at 196.

¹⁶⁹ Resolution 9.2: Priorities for CMS Agreements, adopted at the Ninth COP in 2008.

¹⁷⁰ Resolution 8.22: Adverse Human Induced Impacts on Cetaceans, adopted at the Eighth COP in 2005.

within the CMS. Resolution 8.22 formally acknowledged that ‘human induced impacts on cetaceans are increasing’ and identified six main areas of concern, expressly including ship-strikes.¹⁷¹ Accordingly, the Resolution called for the development of a comprehensive programme of action – in conjunction with the IMO, IWC and other relevant organisations – to address human-induced impacts on cetaceans.

Subsequent to the adoption of Resolution 8.22, the CMS Secretariat has sought to advance these conservation priorities through the development a targeted Programme of Work for Cetaceans,¹⁷² which was formally concluded in 2011 at the Tenth COP.¹⁷³ Resolution 10.15, and the extensive research in support of this initiative,¹⁷⁴ seeks to demarcate regulatory responsibilities for migratory cetaceans between the plethora of multilateral regulators to address problems of so-called ‘treaty congestion’. It also provides a clear appraisal of conservation threats to cetaceans and establishes medium-term priority actions. In this regard, however, vessel-strikes are identified as a more peripheral conservation priority, with a stronger emphasis placed on noise and by-catch concerns. Indeed, on a global level, ship-strike is identified on a global basis as a ‘lower’ priority under Resolution 10.15. Moreover, it is also considered a ‘low’ priority in nine of the 12 specific regions surveyed. Vessel-strikes are identified as a high priority in the North-West Atlantic and a medium priority in the South-West Atlantic and Central and North-West Pacific regions. Despite this status, however, no overarching policies are prescribed to address this issue. Future regulatory initiatives, therefore, appear most likely to be advanced through the major marine mammal subsidiary agreements (the vessel-strike activities of which are outlined below), acting in conjunction with relevant intergovernmental bodies.

4.3 Vessel-strikes and the CMS subsidiary agreements

ASCOBANS

One of the most significant subsidiary agreements to address marine mammals concluded under the auspices of the CMS, and one of its longest-serving, is the Agreement on the Conservation of Small Cetaceans of the Baltic and North

¹⁷¹ The other areas of priority activity were identified as by-catches and entanglements, climate change, pollution, habitat and feeding ground degradation and marine noise.

¹⁷² Resolution 9.9: Migratory Marine Species, adopted at the Ninth COP in 2008.

¹⁷³ Resolution 10.15: Global Programme of Work for Cetaceans.

¹⁷⁴ *Towards a Global Programme of Work for Cetaceans*; Document UNEP/CMS/Inf.10.31.

Seas, as this instrument was originally named.¹⁷⁵ The agreement was opened for signature in 1992 and formally entered into force on 29 March 1994. ASCOBANS applies solely to small cetaceans, defined in line with the IWC's earlier definition as 'any species, subspecies or population of toothed whales Odontoceti, except the sperm whale *Physeter macrocephalus*'.¹⁷⁶

ASCOBANS cites by-catches, habitat deterioration and disturbance as the key factors that may adversely affect populations of small cetaceans within the Agreement area, with a lack of scientific data also identified as a shortcoming to effective conservation efforts.¹⁷⁷ ASCOBANS aims to facilitate cooperation to achieve and maintain a 'favourable conservation status' for all cetaceans in the Agreement area.¹⁷⁸ This concept is not explicitly defined within the Agreement text; however it is widely interpreted as carrying the same meaning as that advanced under the parent Convention. In order to facilitate these objectives, a targeted Conservation and Management Plan is appended to the Agreement. The ASCOBANS Conservation and Management Plan has established five areas of activity which each party is to pursue 'within the limits of its jurisdiction and in accordance with its international obligations'.¹⁷⁹ Although vessel-strike is not explicitly cited as a specific concern, the primary focus of ASCOBANS is to address habitat quality, with particular reference to the disturbance of small cetaceans. A legal basis therefore exists for consideration of this issue under the auspices of the Agreement.

ASCOBANS has noted the conservation problems posed to small cetaceans from shipping activities since its inception; however, its consideration of this issue has been dominated by concerns over ocean noise. Although the Advisory Committee ('AC') to ASCOBANS has held 'high-speed ferries' as a standing agenda item since its first meeting, it was not until the Eighth AC Meeting in 2001 that collisions were specifically recognised as a potential threat to small

¹⁷⁵ 1772 UNTS 217 ('ASCOBANS'). The Agreement area was expanded in 2003, a development that officially entered into effect in 2008, following the requisite five ratifications of the enabling Resolution. ASCOBANS was formally renamed at this juncture, retaining its original acronym. On ASCOBANS generally, see also H Nijkamp and A Nollkaemper, 'The Protection of Small Cetaceans in the Face of Uncertainty: An Analysis of the Ascobans Agreement' (1997) 9 *Georgetown International Environmental Law Review* 281 and RR Churchill, 'The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas' in Burns and Gillespie, note 147 above, at 283.

¹⁷⁶ Paragraph 1.2(a). The IWC definition was outlined in Resolution 1977-6: Reporting Requirements for Small-Type Whaling.

¹⁷⁷ Preamble.

¹⁷⁸ Paragraph 2.1.

¹⁷⁹ Paragraph 2.2.

cetaceans.¹⁸⁰ Likewise, a definition of precisely what is meant by ‘high-speed’ ferries was only advanced in 2000, which considered such vessels as constituting ‘all types of vessels (including hovercraft) capable of travelling at speeds in excess of 30 knots’.¹⁸¹ In 2003, the traditional focus of attention accorded by ASCOBANS to shipping was formally extended to vessel-strikes,¹⁸² and the AC received its first report on this issue.¹⁸³ By 2006, an increasing number of papers were being submitted to the annual AC meetings on this matter. At the Fifth MOP to ASCOBANS, convened in 2006, ‘ship-strikes’ were recognised as one of the adverse implications on small cetaceans by vessel traffic within the Agreement area.¹⁸⁴ However, despite a commitment to conduct further research into the effects on small cetaceans of vessels, especially high-speed ferries, this Resolution was weighted heavily in favour of, and specifically designed to address, anthropogenic noise, as opposed to collisions.

Ship-strikes have only been considered by ASCOBANS in earnest since 2008, at which point a clear mandate for addressing this problem was advanced. At this juncture, collisions with ferries were noted as a particular concern – and one that should be reported on an annual basis to ASCOBANS – while the activities of the IMO, IWC and ACCOBAMS were also observed, with the AC mandated to ‘liaise closely with these organisations’.¹⁸⁵ A review of ship-strike concerns in the ASCOBANS area noted that the organisation ‘should therefore take this matter seriously and examine more closely the actual and potential threats of physical strikes from shipping’.¹⁸⁶ Concerns were also raised about the under-appreciated risk of vessel-strikes from recreational craft on porpoises and seals, particularly in shallow waters, with juveniles considered especially vulnerable.¹⁸⁷

¹⁸⁰ *Report of the Eighth Meeting of the Advisory Committee to ASCOBANS* (Bonn: ASCOBANS, 2001) at 16. In 1999, it was peripherally observed that catamaran ferries travelling at high speeds create ‘a real risk that cetaceans may suffer physical damage from direct impacts with fast boats and vessels’, but there was little concerted debate on this issue: *Report on the Potential Impact of High-Speed Ferries on Small Cetaceans in the ASCOBANS Area and Adjacent Waters*; Document AC6/Doc.17, at 4.

¹⁸¹ *Report of the Seventh Meeting of the Advisory Committee to ASCOBANS* (Bonn: ASCOBANS, 2000) at 8.

¹⁸² *Report of the Tenth Meeting of the Advisory Committee to ASCOBANS* (Bonn: ASCOBANS, 2003) at 11.

¹⁸³ *Ship Collisions with Whales*; Document AC10/Doc.7(P).

¹⁸⁴ Resolution No. 4: Adverse Effects of Sound, Vessels and Other Forms of Disturbance on Small Cetaceans, adopted at the Fifth MOP.

¹⁸⁵ *Report of the Fifteenth Meeting of the Advisory Committee to ASCOBANS* (Bonn: ASCOBANS, 2008) at 14.

¹⁸⁶ *Assessing the Impact upon Cetaceans of Shipping, Including Ferries, in the ASCOBANS Region*; Document AC15/Doc.43.Rev.1(O).

¹⁸⁷ *Possible Impact of Personal Watercraft (PWC) on Harbor Porpoises (Phocoena phocoena) and Harbor Seals (Phoca vitulina)*; Document AC15/Doc.45(O), at 9.

Despite this renewed focus, the advancement of mitigation strategies through ASCOBANS remains rather a work in progress, although a number of noteworthy developments have occurred in recent years. At the Fifteenth AC Meeting, the first major project to ascertain the precise risk posed by ship-strikes in the Agreement area was launched and funded under the auspices of ASCOBANS.¹⁸⁸ In 2011, this project was concluded, revealing the main areas of vessel-strike susceptibility to be the Celtic Sea, Bay of Biscay and north-western waters of Spain.¹⁸⁹ Moreover, while shipping densities were high within the English Channel, southern North Sea and Danish waters, very few areas were considered a high risk for vessel-strikes due to the low cetacean population densities in these waters.¹⁹⁰ These findings may ultimately create a political climate conducive for further navigational measures to be initiated by individual ASCOBANS parties through the IMO in the mid-term future. This may have a more limited impact in the case of Spain, which has thus far declined to participate in ASCOBANS. As noted above, particular measures have been introduced in Spanish Mediterranean waters, hence there is a precedent of acting upon reliable information to address vessel-strike concerns. However, the emergence of IMO-sponsored navigational measures in the Bay of Biscay appears to be a rather distant prospect at present.¹⁹¹ Significantly, ASCOBANS has also started to engage with the private sector with regard to vessel strikes. As a direct result of the ASCOBANS vessel-strike survey, Wallenius Wilhelmsen Logistics, which has a high traffic presence in the highlighted areas, is currently revising its business plan to mitigate vessel-strike risks on a trial basis. If successful, the company has pledged that these measures will be applied worldwide by its fleet and that it intends to work with ASCOBANS on this issue.¹⁹²

Limitations remain in the ASCOBANS approach, however, not least since it has historically only considered 'fast' vessels – that is, those travelling at 30 knots or above – in its deliberations on vessel-cetacean interactions, whereas it is widely acknowledged that marine mammals, especially smaller species, are often killed by vessels at speeds as low as 14 knots.¹⁹³ Moreover, vessel-

¹⁸⁸ *Report of the Fifteenth Meeting*, note 185 above, at 18.

¹⁸⁹ *Project Report: Risk Assessment of Potential Conflicts between Shipping and Cetaceans in the ASCOBANS Region*, Document AC18/Doc.6.04(S) Rev.1, at 10.

¹⁹⁰ *Ibid.*

¹⁹¹ In April 2012 an expert workshop with the participation of scientists, environmental NGOs, the shipping industry and mitigation entrepreneurs considered that 'implementing measures may take several years': RC Bull and DW Smith, *Ship-Strike Workshop Report*, at 7; reproduced on the REPCET website, note 46 above.

¹⁹² *Report of the Nineteenth Meeting of the Advisory Committee to ASCOBANS* (Bonn: ASCOBANS, 2012), at 17.

¹⁹³ Laist, note 8 above, at 39.

strikes have been traditionally considered as an adjunct to noise concerns, which remains a regulatory priority for the Agreement. However, the recent study of vessel-strike considerations has now provided a firm foundation for the elaboration of additional mitigation measures. In this regard, perhaps the most significant development has been the emergence of a closer working relationship in recent years with its sister Agreement, ACCOBAMS, which has long established vessel-strikes as an operational priority. Indeed, at the time of writing, a Draft Resolution was pending consideration at the forthcoming Seventh MOP to ASCOBANS, calling for *inter alia* the 'further consideration of the impact of ship strikes on [small] cetaceans in collaboration with ACCOBAMS and the IWC, making use of the Global Ship Strikes Database of the IWC, and identification of any potential risk areas and mitigation measures if appropriate'.¹⁹⁴

ACCOBAMS

The second subsidiary agreement adopted by the CMS relating to cetaceans was the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS).¹⁹⁵ ACCOBAMS is broader in scope to ASCOBANS and represents one of the first binding regional treaties to explicitly address both large and small species of cetaceans. Of the two main CMS cetacean agreements, ACCOBAMS is largely considered the superior instrument, endowed with stronger conservation obligations and a unique institutional structure that provides a more formalised basis for interaction with pre-existing regulatory fora.¹⁹⁶ Moreover, it has also taken a number of pioneering steps to address anthropogenic threats to cetaceans that have often been neglected in other fora, specifically including ship-strikes.

¹⁹⁴ Draft Resolution: Research and Conservation Actions in the Extended Agreement Area; Document MOP7/Doc.7.03(P) (square brackets contained in the original draft).

¹⁹⁵ 2183 UNTS 303. In 2010, like ASCOBANS, the scope of the Agreement was adjusted through an amendment to the text to include 'the neighbouring Atlantic Area west of the Straits of Gibraltar'. Once the requisite number of ratifications has been received, the Agreement will be formally extended and re-named the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and neighbouring Atlantic Area. On ACCOBAMS generally see WCG Burns, 'The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS): A Regional Response to the Threats Facing Cetaceans' (1998) 1 *Journal of International Wildlife Law and Policy* 113.

¹⁹⁶ RR Churchill, 'Sustaining Small Cetaceans: A Preliminary Evaluation of the Ascobans and Accobams Agreements' in AE Boyle and D Freestone (eds), *International Law and Sustainable Development: Past Achievements and Future Challenges* (Oxford: Oxford University Press, 2001) at 250.

ACCOBAMS is considerably broader in scope than ASCOBANS and applies to 'all cetaceans that have a range which lies entirely or partly within the Agreement area or that accidentally or occasionally frequent the Agreement area'.¹⁹⁷ An 'indicative list' is appended to the Agreement,¹⁹⁸ specifying the Black Sea and Mediterranean Sea populations of some eighteen different species of cetaceans. In marked contrast to ASCOBANS, the regulatory tone of ACCOBAMS is far stronger and more prescriptive, identifying clear objectives incumbent upon its constituent parties. ACCOBAMS has also advanced a number of novel features during its brief tenure to date, including the development of a series of targeted guidelines on various anthropogenic activities affecting cetaceans, together with a pronounced application of the precautionary principle in its conservation policies. As is the case under ASCOBANS, the primary conservation priorities to be advanced under ACCOBAMS are elaborated in a distinct Conservation Plan appended to the Agreement text. In this regard, parties are required to apply 'within the limits of their sovereignty and/or jurisdiction and in accordance with their international obligations' the various conservation, research and management measures prescribed in Annex 2 to the Agreement. The Conservation Plan addresses six broad areas of conservation policy, namely the adoption and enforcement of national legislation; assessment and management of human-cetacean interactions; habitat protection; research and monitoring; capacity building, collaboration and dissemination of information, training and education; and responses to emergency situations.

ACCOBAMS has established a series of policies to address the considerable problem of vessel-strikes within the region. In addition to strong concerns raised by the rates of vessel interactions observed in relation to fin whales, sperm whales are considered especially susceptible¹⁹⁹ and, as noted above, have been subject to TSS amendments through the IMO. The problem of vessel-strikes was noted at an early stage in the operation of ACCOBAMS, with a Recommendation by the ACCOBAMS Scientific Committee calling for research to clarify the habitat range of cetaceans within the Agreement area,

¹⁹⁷ Article I(2). Cetaceans are defined as 'animals, including individuals, of those species, subspecies or populations of *Odontoceti* and *Mysticeti*': Article I(3)(a). The 'range' of a species extends to 'all areas of water that a cetacean inhabits, stays in temporarily, or crosses at any time on its normal migration route within the Agreement area': Article I(3)(f).

¹⁹⁸ Annex I. Under Article I(5), Annexes to the Agreement 'form an integral part thereof, and any reference to the Agreement includes a reference to its annexes'.

¹⁹⁹ M Carrillo and F Ritter, *Increasing Numbers of Ship-Strikes in the Canary Islands: Proposals for Immediate Action to Reduce Risk of Vessel Whale Collisions*; Document SC/60/BC6.

as well as potential mitigation measures.²⁰⁰ Following this, at the Third MOP in 2009 a targeted Resolution was adopted in respect of large whales,²⁰¹ noting the development of mitigation strategies in other areas and observing that this problem was likely to become ever more acute in future years. To this end, parties were urged to *inter alia* communicate with captains and crews of shipping companies to obtain data on strike potential, conduct further research, organise and operate training courses, make use of existing IMO instruments to divert vessel traffic from sensitive areas and encourage the decrease in night traffic. The ACCOBAMS Secretariat was instructed to investigate appropriate liaison with the IMO and to work closely with the Pelagos Sanctuary to address ship-strikes. The Scientific Committee was mandated to provide a steering group to work closely with key global and regional bodies to address vessel-strikes, to identify areas of high-shiping density and to use the Strait of Gibraltar as a model and testing ground for mitigation measures.

At the Fourth MOP, Resolution 3.14 was repealed and replaced by an extensive Resolution on vessel-strikes,²⁰² in the wake of a Joint Workshop convened between ACCOBAMS and the IWC in September 2010. ACCOBAMS has worked closely with the IWC, especially through the SSWG, on vessel-strike issues since 2008. While the IWC remains the global repository for strike data, ACCOBAMS has sought to facilitate a fuller understanding of the scale of this problem in the Mediterranean, especially concerning fin whales. In recent years, ACCOBAMS has correlated a significant volume of vessel-strike data in these waters. The Scientific Committee of ACCOBAMS has also aligned its computer technology and reporting practices with those of the SSWG to ensure consistency of record-keeping and ease of data transfer to the central IWC database.²⁰³ The Joint Workshop therefore represents a culmination of initiatives to promote closer working practices between the two bodies and establishes a further foundation to address vessel-strikes in a region in which this represents a pressing conservation threat to cetaceans.

Among the numerous outcomes of the Joint Workshop, the participants identified a series of priority areas for data collection, especially in the Mediterranean region, and endorsed a proposal for a Joint Two-Year Work Plan to address vessel-strikes, with particular emphasis upon improving consistency

²⁰⁰ Recommendation 2.8: Ship Collisions.

²⁰¹ Resolution 3.14: Ship Strikes on Large Whales in the Mediterranean Sea.

²⁰² Resolution 4.10: Ship Strikes on Large Cetaceans in the Mediterranean Sea.

²⁰³ *Report of the Fifth Meeting of the ACCOBAMS Scientific Committee* (Monaco: ACCOBAMS, 2008), at 9.

of reporting and facilitating global data collection.²⁰⁴ The Joint Workshop was reinforced by Resolution 4.10, which endorsed its main outcomes and called upon the parties to improve data collection, to follow relevant IMO measures and to improve mariner training by considering vessel-strike as a mandatory topic in training crew and watchmen. The ACCOBAMS institutions were also charged with improving liaison with pertinent international bodies to address vessel-strikes. The Scientific Committee to ACCOBAMS has also recommended that parties consider instituting IMO programmes such as MSR schemes;²⁰⁵ this was also further reinforced in Resolution 4.10. There is, therefore, a strong steering from ACCOBAMS on the need to address vessel-strikes, which may ultimately serve to generate a further impetus for its parties to institute appropriate navigational measures in their national waters, in concert with the IMO.

As well as engaging the national authorities, as ASCOBANS has demonstrated, a fundamental aspect of any successful vessel-strike policy will necessarily involve a cooperative working relationship with the shipping industry. In this respect, ACCOBAMS appears to be well-equipped to further engage shipping interests in these waters through its innovative programme of 'ACCOBAMS Partners'. ACCOBAMS recognises the contribution of research organisations, NGOs and other stakeholders with an interest in conservation on a more formalised footing, and may designate partner status upon organisations that 'have the potential to contribute to the mission of the Agreement'.²⁰⁶ Partner status is no mere platitude. Partners make 'a substantial contribution to the successful implementation of the Agreement'²⁰⁷ and receive scientific information on a priority basis. They are obliged to report on their activities and may officially contribute to the development of ACCOBAMS policies and other technical instruments.²⁰⁸ To date, few initiatives have sought to harness the interest of ferry companies, boating organisations and other bodies that may be implicated in vessel-strikes or collect data on an informal basis. As Panigada observes, a considerable volume of strike data has lain inaccessible in

²⁰⁴ *Report of the Joint IWC-ACCOBAMS Workshop on Reducing Risk of Collisions between Vessels and Cetaceans* (Monaco: ACCOBAMS, 2011), at 18-20.

²⁰⁵ Recommendation 6.4: Ship Strikes.

²⁰⁶ Resolution 1.3: Awarding the Status of 'ACCOBAMS Partner', adopted at the First MOP in 2002. Partners are permitted to use a unique logo to demonstrate their affinity with ACCOBAMS: Resolution 1.4: Adopting a Logo for the Agreement, and Conditions for its Use.

²⁰⁷ Resolution 2.9: Recognising the Important Role of Non-Governmental Organisations (NGOs) in Cetacean Conservation, adopted at the Second MOP in 2004.

²⁰⁸ Resolution 3.5: Strengthening the Status of ACCOBAMS Partners, adopted at the Third MOP in 2007.

the files of many local ferry operating companies,²⁰⁹ which may provide further incentives to share this information. Moreover, the conferral of partner status for operators with a particular interest in assisting researchers and mitigating strikes²¹⁰ may provide such organisations with ‘green credentials’ and corporate social responsibility opportunities that constitute valuable and lucrative marketing tools, while also aiding conservation efforts and assisting in navigational safety within their areas of operation.

MOU-based approaches

Finally, as noted above, the CMS provides for the elaboration of less-binding subsidiaries, commonly in the format of MOUs. To date a considerable number of MOUs have been established to promote regional activity to address the conservation needs of a variety of species that have been identified as being vulnerable to vessel-strikes. Of these, however, relatively few have yet considered this problem in particular depth.

Vessel-strikes have only been explicitly cited as a potential conservation threat under four of the CMS marine mammal subsidiaries to date and have as yet received relatively peripheral attention in these fora. The MOU on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia 2001 (IOSEA) has considered boat-strikes to a ‘moderate to strong’ problem in particular areas.²¹¹ However, while the Conservation and Management Plan invites parties to consider restrictions to vessel traffic as a means of addressing habitat concerns,²¹² little coordinated appraisal of this issue has occurred under the auspices of IOSEA, which considers by-catches to be the most pernicious and pressing threat to these species.

The MOU for the Conservation of Cetaceans and Their Habitats in the Pacific Islands Region 2006 also identifies ship-strikes as a factor that may affect the conservation status of cetaceans. The MOU’s Action Plan nonetheless considers that the conservation impacts of vessel-strikes are largely unknown, but may be a ‘potential concern in areas with fast vessels and high concentrations of whales and dolphins’.²¹³ While improving the current understanding of the scale of the problem is identified as an objective for the signatories to follow, it is nonetheless accorded a ‘low’ priority.

²⁰⁹ Note 14 above, at 1288.

²¹⁰ Indeed, as noted by Carrillo and Ritter, ferry companies are increasingly supportive of research efforts and observer programmes within these waters: note 199 above, at 6.

²¹¹ *Report of the Fourth Meeting of the Signatories to IOSEA* (Bonn: CMS, 2006) at 55. This issue has been mainly identified by participants from the Middle East.

²¹² Objective 2.1.

²¹³ *Action Plan to the MOU for the Conservation of Cetaceans and Their Habitats in the Pacific Islands Region*, at 6.

Under the MOU on the Conservation and Management of Dugongs (*Dugong dugon*) and their Habitats throughout their Range 2007, vessel-strikes are acknowledged as one of the 'human activities that may threaten dugong populations directly or indirectly'.²¹⁴ The MOU's Conservation and Management Plan does not subsequently list vessel-strikes *per se* as a distinct area of activity, but contains a sweep-up provision calling on the signatories to address 'other anthropogenic activities' beyond incidental mortality, for which the establishment of appropriate management programmes is identified as a specific action that could be implemented. Tellingly, however, vessel-strikes have not been considered at either of the two meetings convened under the auspices of the MOU to date. Likewise, under the MOU Concerning the Conservation of the Manatee and Small Cetaceans of Western Africa and Macaronesia 2008, vessel-strikes are identified as a factor that could affect the conservation status of small cetaceans. The MOU's Action Plan considers the effect on populations to be largely unknown but 'are, however, a concern in areas where there are fast ferries, dense traffic and high concentrations of small cetaceans'.²¹⁵ It appears that little further consideration has been taken of this issue under the auspices of the MOU, since no official meetings of the signatories have occurred since its conclusion. Accordingly, in the context of MOU approaches, notwithstanding their inherent value as mechanisms to promote and aggregate regional conservation and management activities, the prospect that these bodies may ultimately promote vessel-strike mitigation measures in the manner pursued under ASCOBANS and ACCOBAMS appears decidedly remote.

5 CONCLUDING REMARKS

Over the past 20 years, vessel-strikes have emerged as a significant threat to a number of species of marine mammals, as well as posing particular hazards to navigation. Thus far, attempts to identify the scale of the problem, the species most at risk and to establish optimal mitigation measures have been largely concentrated in particular regions and a small number of individual jurisdictions. The implications of vessel-strike on marine mammal populations and safety of navigation are accordingly little known outside North America and Southern Europe. Although this issue has grown in regulatory importance in

²¹⁴ Preamble to the MOU.

²¹⁵ *Action Plan to the MOU Concerning the Conservation of the Manatee and Small Cetaceans of Western Africa and Macaronesia*, at 5. Vessel-strikes are not seemingly considered to be an issue affecting manatees under the Action Plan.

recent years, mitigation responses are still in their relative infancy and there has been comparatively limited progress to address vessel-strikes on a global level.

Vessel-strikes pose a multifaceted threat – and one that is often highly species-specific and location-dependent – for which the advancement of effective mitigation strategies remains a work in progress. There are few easy solutions or managerial panaceas that can be adopted on a global or regional basis to confront this issue. Speed restrictions are considered a key policy in this respect, but the complicated movements and often poor site-fidelity of marine mammals means that they can be highly challenging to institute effectively in practice.²¹⁶ It is also apparent that speed limits require a mandatory application²¹⁷ and rigorous enforcement²¹⁸ if they are to have the desired effect. Navigational adjustments are also highly significant, but are likewise heavily dependent upon the political will of coastal states to study and appreciate the problem and to undertake the necessary processes before the IMO to establish remedial measures. This also requires a sustained investment in concerted studies of marine mammal movements in order to generate sufficient data to establish and maintain navigational restrictions. Finally, when these processes are successfully undertaken, clear engagement is needed with a variety of marine interests affected by any resultant mitigation measures to promote compliance with what are, in many instances, voluntary standards that may have financial implications for industries operating within the current straitened economic climate.

The problems and limitations of these approaches, combined with increasing concerns over the impacts of vessel traffic in the marine environment, has facilitated a stronger degree of cooperation between the IMO and the various species management bodies, which had until the recent past operated in virtual isolation to each other. Promising working relationships have been engendered between these organisations and a strong degree of mutuality of purpose has emerged. In a relatively brief period of time the IWC has established a clear global forum to store and process vital data on vessel-strikes, which will strongly contribute towards identifying incident hotspots for which further navigational policies may be required. The CMS, especially through ACCOBAMS and, increasingly, ASCOBANS, has also provided a forum for

²¹⁶ On the limitations of speed restrictions and closed areas in respect of highly mobile species see A Strekenreuter, R Hardcourt and L Möller, 'Are Speed Restriction Zones an Effective Management Tool for Minimising Impacts of Boats on Dolphins in an Australian Marine Park?' (2012) 36 *Marine Policy* 258 at 262.

²¹⁷ Lagueux *et al.*, note 107 above, at 74.

²¹⁸ Laist and Shaw, note 21 above, at 476 to 478.

scientific engagement and the promotion of potential mitigation strategies. Together, both the IWC and the CMS have played an increasingly significant role in raising political and scientific awareness of the scale of the problem, which it is hoped will prompt further states to act through the IMO to address vessel-strikes in their jurisdictional waters. In this regard, this new working relationship between the IMO and natural resource treaties ought to be considered increasingly significant in promoting regulatory responses to vessel-strikes, as well as other adverse ship-source impacts on marine biodiversity such as anthropogenic noise, in future years.