5 Application of the precautionary principle to vessel-source pollution

The precautionary principle is present in virtually all areas of international marine environmental law.[1] The regulation of vessel-source pollution of the marine environment is also increasingly influenced by the precautionary principle. However, contrary to the influence exercised in other areas of marine environmental protection, it is often not explicit. The regulation of international shipping is the function of the International Maritime Organization (IMO), where environmental concerns have gradually been taken into account since the 1960s.[2] The Marine Environmental Protection Committee (MEPC) of the IMO is in charge of addressing environmental issues posed by maritime transport. Other committees, such as the Navigation Committee (NAV), the Legal Committee (LEG) and the Maritime Safety Committee (MSC), also influence marine environmental law with regard to shipping and navigation.

This chapter[3] will highlight the effects that the precautionary principle is having on the activities of the IMO for the protection of the marine environment against threats posed by international shipping.

5.1 The International Maritime Organization and the precautionary principle

5.1.1 Agenda 21

The formal endorsement of the precautionary principle in the activities of the IMO originates in Agenda 21 of the 1992 UN Conference on Environment and Development (UNCED). As a general recommendation, paragraph 17.1 of Agenda 21 calls for 'approaches [to marine and coastal area management and development] that are integrated in content and are precautionary and

1 See above, Chapter 3.

2 For an overview of the IMO's activities in the field of environmental protection see: Blanco-Bazán, A., 'The Environmental UNCLOS and the Work of IMO in the Field of Prevention of Pollution from Vessels', in Kirchner, A., *International Maritime Environmental Law* (Kluwer Law International, The Hague/New York, 2003) 31.

3 This chapter was published in parts in: Sage, B., "Precautionary Coastal States Jurisdiction", (2006) 37 *Ocean Development and International Law* 359.

anticipatory in ambit'.[4] The UN Convention on the Law of the Sea (UNCLOS)[5] constitutes the legal framework within which these approaches must be based, because it lays down the rights and obligations of all States in relation to the management of the oceans.[6] UNCLOS itself was discussed, negotiated and drafted from 1973 to 1982, in the context of the expansion of the scope and importance of international environmental law, starting with the 1972 Stockholm Conference on the Human Environment.[7] The final draft of the Convention was therefore most certainly influenced by the emerging principles of international environmental law, in particular those enshrined in the Stockholm Declaration. The insertion of article 192 in UNCLOS, on the duty of all States to protect the marine environment against pollution by ships is an example of such influence. It can indeed be linked to Principle 21 of the Stockholm Declaration.[8] UNCLOS opted for a balance of the rights and duties of coastal States with those of maritime States, and not for the adoption of strict and inflexible principles. The Convention is often referred to as 'the package deal'.[9] Such balance, by definition, is open to change, and it is arguable that this change can happen under the influence of international environmental law.

Agenda 21 identifies three well-known sources of degradation of the marine environment, namely land-based source pollution, maritime transport and dumping at sea.[10] With respect to these three sources of environmental degradation, Agenda 21 calls on States to 'apply preventive, precautionary and anticipatory approaches so as to avoid degradation of the marine environment, as well as to reduce the risk of long-term or irreversible adverse effects upon it'.[11] In relation to degradation of the marine environment due to sea-based activities, the recommendations are addressed to States, the IMO, other relevant international organisations and other competent UN organisations. States must always act within the limits of existing international law or, if they seek to impose new standards or regulations, do so within the appropriate international forum, i.e. the IMO.[12] They are encouraged to ratify and

4 Agenda 21, Chapter 17, paragraph 1, available at: http://www.unep.org/Documents/Default.asp?DocumentID=52&ArticleID=65

5 United Nations Convention on the Law of the Sea (Montego Bay), 21 *ILM* (1982) 1261.

6 UNCLOS was not in force at the time of the Rio Conference, but it has since been ratified by the required number of States and came into force in December 1994.

7 de La Fayette, L., 'The Marine Environment Protection Committee: the Conjunction of the Law of the Sea and International Environmental Law', 16 (2001) *International Journal of Marine and Coastal Law* 155, pp. 157–8.

8 See above Chapter 3.

9 For example: Allott P, "Power Sharing in the Law of the Sea", (1983) 77 *American Journal of International Law* 1.

10 Agenda 21, above, note 4, para. B, 17.18 to 17.43.

11 Ibid., para. 17.22(a).

12 *Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organization*, Study by the Secretariat of the International Maritime Organization (IMO),

implement existing international conventions and protocols on international shipping,[13] cooperate to ensure the enforcement of the relevant instruments (for instance in monitoring illegal discharges contrary to MARPOL provisions),[14] and assess the need for further international rules to 'reduce the risk of accident and pollution from cargo ships'.[15] The task that is recommended to the IMO by Agenda 21 is to identify certain areas where shipping is particularly dense and congested, to assess the state of marine pollution in those areas and to propose means to ensure compliance with international standards herein, discharge standards in particular.[16] International straits are proposed as an example where the IMO should assess marine pollution, and propose measures in compliance with Part III of UNCLOS, on 'Straits Used for International Navigation'.[17]

This brief presentation of the relevant sections of Agenda 21 highlights two important points. States appear to be under an obligation to adopt a precautionary approach to vessel-source pollution, while remaining within the limits of international law. Simultaneously, Agenda 21 requires the IMO to take proactive measures for the protection of the marine environment. In November 2011, the IMO adopted its strategic plan for 2012–2017, and stated that:'the challenge for the IMO, in line with the global emphasis on sustainable development, is to be proactive in identifying shipping activities and incidents that *could* have an adverse impact on the environment and, therefore, in developing corresponding preventive measures.'[18] The commitment by IMO to identify activities and incidents that could be detrimental for the environment indicates a precautionary approach. At the same time, the strategic plan is careful to emphasise the necessity for the organisation to 'promote the efficiency of shipping',[19] and the IMO's Legal Committee continues to refer to flag States as having 'primary responsibility' to enforce safety and environmental shipping regulations.[20]

The debate about coastal States' jurisdiction therefore remains within the traditional boundaries of international law of the sea. In this respect, reference to the precautionary principle could well allow the introduction of an element of progressive change. At the time of drafting Agenda 21, the precautionary principle was emerging, and its contours were not

LEG/MISC.7, 19 January 2012, available at: http://www.imo.org/ourwork/legal/documents/implications%20of%20unclos%20for%20imo.pdf, pp. 7–8.

13 Agenda 21, above, note 4; ibid., para. 17.30(a)(i).

14 Ibid., para. 17.30(a)(iii).

15 Ibid., para. 17.30(a)(viii).

16 Ibid., para. 17.31.

17 Ibid.

18 *Strategic Plan for the Organization (for the six-year period 2012 to 2017),* IMO Assembly Resolution 1037(27), 22 November 2011, p. 5, emphasis added.

19 Ibid.

20 *Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organization*, above, note 12, p. 12.

clearly defined. However, since 1992 it has acquired status and authority, and is used in specific applications[21] in marine environmental law. The purpose of the following sections is to demonstrate that the precautionary principle is already exercising an influence on the regulation of navigation.

5.1.2 IMO's Marine Environmental Protection Committee

The Marine Environmental Protection Committee (MEPC) of the IMO constituted an intersessional correspondence group in 1994, at its 35th session, entrusted with the task of considering the possible applications of the precautionary approach to the IMO's activities. The correspondence group based its discussions on a paper presented by the delegation of the Netherlands, which proposed that:

> the contracting parties shall be guided by a precautionary approach to environmental protection whereby appropriate preventive measures are taken when there is reason to believe that substances or energy introduced into the marine environment or activities taking place in the marine environment are likely to cause harm even where there is no conclusive evidence to prove a causal relationship between inputs/activities and effects.[22]

It must immediately be noted that this definition does not solely include harm to the marine environment by the introduction of substances into the marine environment, but also by activities. This is indeed adapted to the activities of the IMO, which regulates shipping in general and not just the shipment of harmful substances. On the basis of this Dutch proposal, one author has identified four elements that the precautionary principle, as applied to the marine environment, should include, either substantively or in principle. First, the precautionary principle should be focused on preventing pollutants from entering the marine environment. Second, action should be taken even without conclusive scientific evidence of a causal relationship between contaminants or an activity and 'observed ecosystem damage'. This means that in application of the precautionary principle an activity may be modified or ended if there are scientific reasons to believe that harm to the ecosystem may occur. Third, the burden of proof should be shifted to rest on those who are proposing to carry out the activity. The latter should show that there is no 'legitimate concern' that harm may result from the activity.

21 See above, Chapter 4.

22 As reported by Lentz, S., 'The Precautionary Approach and the IMO', in *1995 International Oil Spill Conference (Achieving and Maintaining Preparedness) Proceedings*, 27 February–2 March 1995, Long Beach, California, pp. 667–71, at p. 669.

Fourth, investments should be turned towards research and application of clean technologies and the identification of harmful substances.[23]

The MEPC adopted in 1995 a resolution on 'Guidelines on the incorporation of the Precautionary Approach in the context of specific IMO activities'.[24] The preamble of the resolution refers in general terms to Principle 15 of the Rio Declaration on the precautionary principle and to Agenda 21. Principle 15 and Chapters 17.21 and 17.22 of Agenda 21 are then explicitly recalled in the body of the resolution. The MEPC acknowledges in this resolution that accidents and incidents 'giving rise to damage to the environment' are due to a lack of compliance with and enforcement of existing technical standards and procedures. Significantly then, the Resolution states that the 'underlying philosophy of the precautionary approach' could be 'usefully applied' to activities of the IMO relating to enforcement by flag States, port States and the International Ship Management[25] (ISM) Code. IMO activities relating to these areas of enforcement should incorporate the precautionary principle in their decision-making and management. For instance, the IMO should ensure that environmental assessment and risk analysis accompany its decision-making process, in order to evaluate the impacts of regulated activities and alternative solutions. Decisions should also be based on the relevant data on the state of the environment and environmental changes. More importantly, the IMO 'should ensure anticipation and prevention of environmental problems arising for any regulatory activities' in application of the precautionary approach.[26] The MEPC resolution may seem to adopt a cautious course of action with regard to the application of the precautionary principle. It does not endorse fully the Dutch proposal. However, one could argue that the 1995 MEPC resolution was a landmark in the activities of the IMO in general and of the MEPC in particular, which from then onwards were decisively marked by the precautionary principle.

The following sections will aim to show that the incorporation of the precautionary principle in IMO activities has played a significant role in the extension of the powers of coastal States in relation to enforcement of international law of the sea to protect the marine environment. The designation of Particularly Sensitive Sea Areas, the adoption of ship routeing measures and the provision of pilotage or Vessel Traffic Services to foreign ships could be considered as precautionary. Indeed these measures have the effect of restricting to a certain extent the freedom of navigation of ships on the basis of precautionary policies, with a view to preventing the occurrence of

23 Ibid., p. 667.

24 MEPC Resolution 67(37), 37/22/Add1 of 15 September 1995.

25 The International Ship Management Code provides guidelines for the safe operation of ships and the prevention of pollution by ships.

26 Ibid.

maritime casualties that would adversely affect the marine environment. The application of the precautionary measures is dependent upon environmental criteria relating to the sea areas where ships navigate. It is submitted that these criteria, which are analysed below, could complement the substance of the Generally Accepted International Rules and Standards (GAIRS) and Applicable International Rules and Standards (AIRS) to which UNCLOS refers when laying out the framework of rights and duties of coastal States.

5.2 Practical applications of the precautionary principle by the IMO

The designation and regulation of marine protected areas are governed by UNCLOS. It can be argued that they are also influenced by the precautionary principle. For instance, article 194(5) of the Convention states that 'rare or fragile ecosystems as well as the habitats of depleted, threatened or endangered species and other forms of marine life' must be protected by adequate measures. Similarly, in Part XII, and in particular article 234, the Convention deals with enclosed and semi-enclosed seas and ice-covered sea areas. Also, according to article 211(6), areas of the territorial waters and EEZ of coastal States, and of the high seas, may be identified for the purpose of the application by coastal States of specific, mandatory protection measures against vessel-source pollution of their oceanographic, ecological and resources particularities. While UNCLOS does not explicitly refer to the precautionary principle, it can be argued that there is a clear link between the Convention and the application of the principle in international marine environmental law. UNCLOS provides a conventional legal basis for the application of the precautionary principle to the regulation of marine activities.[27] The texts of Agenda 21 and of the Rio Declaration, in which the precautionary principle is explicitly applied to marine environmental protection, are not binding rules of international law. However, they can commend an interpretation of UNCLOS in the light of the precautionary principle, particularly when one takes into account the development of international marine environmental law on the basis of the principle.[28]

Other conventions for the protection of the marine environment against vessel-source pollution make provisions for the designation of marine areas that will benefit from particular protection measures, and for the adoption of navigational measures. These include the Special Areas under MARPOL,[29]

27 Yankov, A., 'The Law of the Sea Convention and Agenda 21: Marine Environmental Implications', in Boyle, A. and Freestone, D. (eds) *International Law and Sustainable Development: Past Achievements and Future Challenges* (OUP, Oxford, 1999).

28 See above, Chapters 3 and 4.

29 International Convention for the Prevention of Pollution by Ships (MARPOL) (London), 12 *International Legal Materials* (1973) 1319, amended by Protocol of 1978, 17 *International Legal Materials* 546 (1978) 546.

where special restrictions apply on discharges of certain substances. Under SOLAS,[30] Areas To Be Avoided may be designated, where shipping will be prohibited, and Precautionary Areas, Traffic Separation Schemes and other kinds of ships' routeing measures may also be adopted to regulate international navigation. In addition, a number of regional conventions deal with specific aspects of marine pollution, many of them incorporating the precautionary principle in the text of their conventions. Such conventions were adopted in order to ensure the prevention of pollution and protection of the marine environment in the north-east Atlantic, the North Sea and the Baltic Sea.[31] The principle is also present in IMO measures for the regulation of international shipping, taken in the context of UNCLOS. The concept of Particularly Sensitive Sea Areas is a typical example of the direct influence of precautionary thinking in adopting measures for the regulation of international navigation in coastal areas. The legal powers of coastal States under UNCLOS could therefore be interpreted in light of the precautionary principle. As noted by one author:

> The recognition of the concept of Particularly Sensitive Areas and the identification of such areas could assist in the process of developing a basis for the uniform application of jurisdictional and enforcement principles in environmentally significant marine areas which form a single ecological unit.[32]

5.2.1 Particularly Sensitive Sea Areas

5.2.1.1 Purpose of Particularly Sensitive Sea Areas

The concept of identifying marine areas in order to vest them with a special protected status was considered by the IMO as early as 1966, when France and Russia proposed to designate respectively the Rochebonne Shelf and

30 International Convention for the Safety of Life at Sea (SOLAS), *UKTS* 46 (1980), in force 25 May 1980.

31 1969 Agreement for Cooperation in Dealing with Pollution of the North Sea by Oil (Bonn) (1970) 9 *International Legal Materials* 359, in force 9 August 1969; 1992 Paris Convention for the Protection of the North East Atlantic (1993) 32 *International Legal Materials* 1072, in force 15 March 1998;1979 Convention on Long-Range Transboundary Air Pollution (Geneva) (1979) 18 *International Legal Materials* 1442, in force 16 March 1983; 1992 Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki), available at: http://www.helcom.fi/Convention/en_GB/text/, in force 17 January 2000.

32 French, D., 'Legal Mechanisms for Protection and Preservation of the Marine Environment: Their Relationship to Particularly Sensitive Areas', *Proceedings, International Seminar on Protection of Sensitive Areas* (Preliminary Edition), Malmö, Sweden, 25–28 September 1990, IMO, London.

the region of Cape Terpeniya as Areas To Be Avoided (ATBA) under the SOLAS Convention.[33] From 1971 to 1991 a number of sea areas were designated as ATBAs and certain routeing measures applied, such as Traffic Separation Schemes (TSS). Under the MARPOL Convention, 'Special Areas' may be identified where restricted discharge standards will then be imposed.[34] ATBAs, Special Areas and other ships' routeing measures were the instruments that were at the IMO's disposal for the regulation of navigation for environmental protection purposes until the concept of Particularly Sensitive Sea Areas (PSSA) was first introduced and adopted by the IMO in 1991.[35] The first PSSA to be adopted by the MEPC was for the Great Barrier Reef.[36] The MEPC also recommended that ships adopt the pilotage system put in place by Australia in the designated area as a measure of protection.[37]

It was understood that international shipping poses certain risks of harm to the marine and coastal environment, such as operational discharges, accidental or intentional pollution and physical damage to marine habitats or organisms. By designating PSSAs, coastal States can apply measures to sea areas under their jurisdiction that may interfere with the freedom of navigation, including innocent passage, available to all ships under international law of the sea, in order to protect their interests against such threats.

A PSSA is 'an area that needs special protection through action by the IMO because of its significance for recognized ecological, socio-economic, or scientific reasons and which may be vulnerable to damage by international shipping activities'.[38] The identification of such an area must be done on the basis of scientific, technical, economic and environmental information. An assessment of the particular risks posed by international shipping must be carried out, and the measures proposed to protect it must also be based on accurate information. The identification of an area as a PSSA constitutes the basis for applying to the identified area 'Associated Protective Measures' (APMs), such as: the designation of MARPOL Special Areas; the adoption of ships' routeing and reporting measures under SOLAS; and the adoption of

33 Peet, G., 'Particularly Sensitive Sea Areas: A Documented History', 9 (1994) *International Journal of Marine and Coastal Law* 469, p. 471.

34 International Convention for the Prevention of Pollution by Ships (MARPOL), amended by the 1978 Protocol 1978, 1340 *UNTS* 61, Annexes I, II and III.

35 IMO Resolution A.720(17) containing the 'Guidelines for the Designation of Special Areas and the Identification of Particularly Sensitive Sea Areas'.

36 *Report of the Marine Environment Protection in its 30th Session*, 8 January 1991, MEPC 30/24, Annex 17.

37 Ibid., Annex 18.

38 IMO Assembly Resolution A.982(24), *Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas*, adopted on 1 December 2005. Resolution A.982(24) replaces earlier guidelines of IMO Assembly Resolution A.927(22), adopted on 29 November 2001.

other measures that have 'an identified legal basis'.[39] The innovation in the concept of PSSA is twofold. First, it formalises at the IMO level the consideration of environmental protection needed in certain areas in order to adopt measures for the regulation of international navigation by coastal States. Second, the concept of PSSA allows the cumulative application of navigation control measures under several IMO conventions.

The most recent instrument on PSSAs is 2005 IMO Resolution A.982(24), 'Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas',[40] which revoked and superseded previous guidelines and resolutions by IMO on the matter.[41] The adoption of the PSSA concept by the IMO reflects its greater awareness of environmental concerns, and the necessity to include environmental sensitivity factors in traditional law of the sea approaches. The emergence of the concept of PSSAs became an opportunity for coastal States to address, within the IMO forum, the issue of their jurisdiction in coastal areas and to discuss the matter with flag States. In this respect, it can be seen as a direct invitation to apply the precautionary principle to the matter of coastal States' jurisdiction.

From 1990 to 1994 groups of legal experts met on three occasions (Malmö 1990, Hull 1992 and Texel 1994) to examine the legal implications of the proposed PSSAs.[42] The significant issue about PSSAs was whether their accompanying measures were based exclusively on existing legal instruments or whether they created new legal mechanisms. It was in fact recommended at the Malmö Meeting of Legal Experts[43] in 1990 that PSSAs could be integrated in the UNEP Regional Seas Protocols on Protected Areas in an effort to clarify and settle their legal status. However, the 1992 Hull Meeting of Legal Experts[44] suggested that PSSAs would need to be afforded a singular status in international law, as some of their Associated Protective Measures (APMs) could be new instruments, not embedded in existing conventions or agreements. An entirely new status, formally adopted according to the rules of public international law, would allow taking tailor-made APMs. At the

39 Resolution A.982(24), ibid., para. 6.1. It is noted that under the new resolution A.982(24), reference to compulsory pilotage and vessel traffic management systems, which was explicit under Resolution A.927 (22), has been removed.

40 2005 PSSA Guidelines, above, note 38.

41 IMO Assembly Resolution A.927(22), above, note 38, which itself repealed and replaced IMO Assembly Resolution A.885(21), *Procedures for Designation of Particularly Sensitive Sea Areas and the Adoption of Associated Protective Measures and Amendment to Guidelines contained in Resolution A720(17).*

42 Gjerde, K. and Freestone, D. (eds) 'Particularly Sensitive Sea Areas – An Important Environmental Concept at a Turning Point' (1994) (Special Issue) 9(4) *International Journal of Marine and Coastal Law.*

43 25-28 September 1990, Report of the Meeting at MEPC 20/INF.27.

44 The Law School, University of Hull, 20–21 July 1992, MEPC 33/INF.27, 1 September 1992.

final Meeting of Legal Experts in Texel (the Netherlands) in 1994,[45] it was noted that only one area had been designated since the introduction of the concept by the IMO in 1990. Legal opinion was still divided on the legal status of PSSAs. It was, however, admitted that UNCLOS did perhaps not provide sufficient scope to coastal States to protect their interests and that PSSAs might need a direct legal basis.[46] The matter was not settled until the adoption of the 2005 PSSA Guidelines, which require that APMs should have an established legal basis.[47]

5.2.1.2 Designation process of Particularly Sensitive Sea Areas and adoption of Associated Protective Measures

The designation process of PSSAs involves the IMO at every level, and requires its final approval. In addition to the 2005 PSSA Guidelines of Resolution A.982(24), in 2006 the MEPC issued a circular containing guidance for States willing to submit a PSSA proposal.[48] Resolution A.982(24) proposes an identification process for PSSAs, which can be argued to be based on the precautionary principle. A preliminary step to this process is the consideration of the various risks that shipping may pose to the marine environment in general. Then the environmental sensitivity of sea areas is assessed with reference to a list of pre-established criteria. Factors are then listed for the evaluation of the risks posed by international shipping to areas identified by the environmental sensitivity criteria. Finally, navigation restriction measures can be taken in order to protect the identified areas against the risks highlighted by the evaluation process.

The first step of the identification process requires showing that an area proposed as a PSSA meets at least one of the environmental sensitivity criteria listed in the PSSA Guidelines in its entirety. There are 11 ecological criteria, three social, cultural and economic criteria, and three scientific and educational criteria. The ecological criteria include: uniqueness or rarity, critical habitat, dependency, representativeness, diversity, productivity, spawning and breeding grounds, naturalness, integrity, fragility and biogeographic importance. The notion of ecosystem is central to the application of these ecological criteria. For instance, uniqueness and rarity are defined as features of an ecosystem. Dependency is also defined with reference to the characteristics of an ecosystem: it is the dependency of the diversity of an ecosystem on its structuring organisms, and the dependency of migratory routes on this ecosystem.

45 1–3 June 1994, Report of the Meeting at MEPC 36/21/4, 4 August 1994.

46 Gjerde, K. and Freestone, D., above, note 41, 'Report of the 3rd Meeting of Legal Experts on PSSAs, 1994', p. 459.

47 See below text with note 65.

48 MEPC1/Circ.510, 10 May 2006, *Guidance Document for Submission of PSSA Proposals to IMO*.

The reference to ecosystem is significant in relation to the precautionary principle. Indeed, the precautionary principle applied to IMO activities requires the assessment of potential harm to an ecosystem posed by shipping activities. Moreover, the low threshold of requiring only one criterion to be met could be an application of the precautionary principle, which favours erring on the side of caution in favour of environmental protection.[49] Besides these criteria, which relate directly to the ecological quality of a sea area, the Guidelines include social, economic and cultural factors. They measure the significance of a sea area for human activities: the economic use of its living marine resources, its recreational use and the human dependency upon it. Finally the Guidelines criteria indicate the scientific and the educational interest of an area proposed as PSSA. It appears therefore that this first level in the PSSA identification process is relatively simple to fulfil. Arguably this low threshold could well be an application of the precautionary principle, which requires erring on the side of caution in favour of environmental protection. At first sight it appears that the burden of proving the environmental sensitivity of an area and the necessity to apply protective measures lies with coastal States, but it is clear that this is a light burden.

The second step in identifying a PSSA is the assessment of the risks posed by international shipping to the marine area considered. Section 5 of the PSSA Guidelines divides the risks that may be considered into two categories: vessel traffic characteristics and natural factors.

Risks generated by the traffic of vessels and that must be assessed are of four kinds. First, there are operational factors, which are the 'types of maritime activities . . . that may increase risk to the safety of navigation'.[50] Then the types of vessels passing near the area in question must be examined to see, for instance, if they have 'small under-keel clearance'.[51] Third, the characteristics of the traffic of vessels must be considered, from the point of view of the 'volume or concentration of traffic, vessel interaction, distance offshore, or other dangers to navigation . . . such as to involve greater risk of collision or grounding'.[52] Finally, substances that, if released, would be harmful to the sea, must be taken into account.

The natural factors to be considered in assessing the risks posed by international shipping to the marine area in question are hydrographical, meteorological and oceanographic. The hydrographical factors include 'water depth,

49 Although it is noted that under the previous guidelines of Resolution A.927(22) there was only a need to show the presence of one criterion in the area, without reference to its geographical scope. The new guidelines require that 'information and supporting documentation should be provided to establish that at least one of the criteria exists throughout the entire proposed area, though the same criterion need not be present throughout the entire area' (Resolution A.982(24), para. 4.4).

50 Resolution A.982(24), para. 5.1.1.

51 Ibid., para. 5.1.2.

52 Ibid., para. 5.1.3.

bottom and coastline topography, lack of proximate safe anchorages and other factors which call for increased navigational caution'.[53] The meteorological factors are 'prevailing weather, wind strength and direction, atmospheric visibility and other factors which increase the risk of collision and grounding and also the risk of damage to the sea area from discharges'.[54] Finally, the oceanographic factors are 'tidal streams, ocean currents, ice, and other factors which increase the risk of collision and grounding and also the risk of damage to the sea area from discharges'.[55]

There is a certain vagueness about these criteria. They are not accompanied by quantitative measures that require a threshold of risk posed by international shipping. From a qualitative point of view, they do not provide much detail either. For instance, the criterion of 'vessel types' is defined as 'types of vessels passing through or adjacent to the area (e.g. high-speed vessels, large tankers, or bulk carriers with small under-keel clearance)'.[56] There is no mention of the technical condition of the ship, its age or the capability of the crew. It seems that the 'vessel traffic characteristics' are aimed at assessing the risks posed to a proposed area by international shipping passing by as a whole, and do not allow for the taking into account of the features of certain ships in particular. However, the level of risk that the PSSA Guidelines require to be demonstrated for an area to be identified as a PSSA is linked with the types of measures proposed to protect it. In assessing the likelihood of occurrence of harm by international shipping to the identified vulnerability of the area, a number of factors must be considered:

- whether there is evidence of damage, 'including the significance or risk of the potential damage',[57] the 'degree of harm',[58] and 'whether such damage is reasonably foreseeable',[59] as well as whether 'damage is of a recurring or cumulative nature';[60]
- whether there is a history of groundings, collisions or spills resulting from shipping incidents in the area;
- whether there is the possibility of environmental impact outside the proposed PSSA resulting from the very designation and application of measures;
- whether there are stresses from other environmental sources;
- whether there are already measures in place, and their impact.

53 Ibid., para. 5.1.5.
54 Ibid., para. 5.1.6.
55 Ibid., para. 5.1.7.
56 Above, note 51.
57 Resolution A.982(24), para. 5.2.1.
58 Ibid., para. 5.2.1.
59 Ibid., para. 5.2.1.
60 Ibid., para. 5.2.1.

The likelihood of occurrence of damage is a difficult element to assess. The precautionary principle, which requires that action should be taken if risks of damage are suspected but not confirmed by scientific evidence, is likely to have a significant impact on this notion of foreseeability of damage. Indeed, it could be used to establish that damage is foreseeable because it is suspected, even if there is no conclusive scientific evidence available to confirm it. In other words the precautionary principle could have the effect of lowering the threshold of risk required to establish that damage is foreseeable. A detailed analysis of the actual application of these criteria by coastal States is carried out below on the basis of the PSSAs that have been proposed for identification by States throughout the world, in order to determine the threshold of risk and the degree of foreseeability required.[61]

The third step in the identification process requires proposing 'Associated Protective Measures' (APM) in order to 'prevent, reduce or eliminate the identified vulnerability'[62] of the proposed PSSA. Significantly, the PSSA Guidelines do not introduce new, specific measures for PSSAs. APMs must be instruments of marine environmental protection that already exist in international law of the sea and within the competence of the IMO. In particular, APMs may be taken under MARPOL, in the form of special discharges restrictions in 'Special Areas'.[63] They can also be measures under SOLAS, such as ships' routeing and reporting systems.[64] As aforementioned, there must be a clear link between the vulnerability of a proposed PSSA and the adequacy of the proposed APMs. In other words, it must be demonstrated 'how the identified vulnerability will be addressed by existing or proposed associated protective measures'.[65]

In addition, the APMs must have appropriate legal basis in existing legal instruments, and if proposed measures do not yet exist, States must suggest ways of bringing the necessary new legal measures into force. The 2005 Resolution A.982(24) thereby clarifies and strengthens the requirement for a legal basis to APMs. Under the previous PSSA Guidelines of Resolution A.927(22), it was merely required that the IMO approved APMs, which suggested that new types of measures could be adopted by IMO, independently of existing legal conventions and instruments. Some experts considered that the clarification brought by the new guidelines unnecessarily restricts the flexibility of UNCLOS, by preventing the IMO from taking a proactive role in adopting new measures on the basis of UNCLOS's general provisions.[66]

61 See below, section 2.1.6, 'Practical risk assessment of international shipping'.
62 Resolution A.982(24), para. 3.2.
63 MARPOL, above, note 34, Annexes I, II and V.
64 SOLAS, above, note 30, Regulation 10(2) of Chapter V.
65 Resolution A.982(24), para. 7.4.
66 See, for instance, the Comments on MEPC 52/8 Submitted by WWF, on Proposed Amendments to Assembly Resolution A.927(22) to Strengthen and Clarify the Guidelines

This change occurred following a heated debate at IMO relating to the legality of APMs requested for the Western European PSSA.[67]

The PSSA Guidelines are aimed at assessing the level of risk posed by international shipping to certain areas, at determining whether or not special preventive measures are required, and at adopting such measures. The Guidelines are focused on the features of certain marine areas, on the characteristics of possible damage that may arise from international shipping, and on the likelihood of occurrence of such damage. While it can be said that under the old regime of Resolution A 927(22) coastal States seemed to have more leeway in designing APMs, the new regime of Resolution A.982(24) does not alter the main features of the PSSA concept. It appears the PSSA designation process and its regime of APMs is precautionary 'in essence' and that it can be likened to an environmental impact assessment in general international environmental law. The following sections will demonstrate that, in practice, States proposing PSSAs have in fact followed this precautionary approach.

5.2.1.3 Existing and proposed PSSAs

There are currently 13 identified PSSAs:

1 the Great Barrier Reef and the Torres Strait in Australia and Papua New Guinea, designated respectively in 1990[68] and 2005;[69]
2 the Archipelago of Sabana-Camaguey in Cuba, designated in 1997;[70]
3 the Malpelo Island in Colombia, designated in 2002;[71]
4 around the Florida Keys in the USA, designated in 2002;[72]
5 the Wadden Sea in Denmark, Germany and the Netherlands, designated in 2002;[73]
6 the Paracas National Reserve in Peru, designated in 2003;[74]

for the Identification and Designation of Particularly Sensitive Sea Areas (PSSAs), MEPC 52/8/4, 18 August 2004.

67 For a report and analysis of this debate see Roberts, J., Tsamenyi, M., Workman, T. and Johnson, L., 'The Western European PSSA proposal: a "politically sensitive sea area"' (2005) 29 *Marine Policy* 431.

68 MEPC 45(30), *Protection of the Great Barrier Reef Region*, 16 November 1990.

69 Report of the Marine Environment Protection Committee at its 53rd session, MEPC 53/24, 18–22July 2005, para. 8.33.2.

70 MEPC 74/40, *Identification of the Archipelago of Sabana-Camaguey as a Particularly Sensitive Sea Area*.

71 MEPC 97/47, *Identification of the sea area around Malpelo Island as a Particularly Sensitive Sea Area*.

72 MEPC 98/47, *Identification of the sea area around the Florida Keys as a Particularly Sensitive Sea Area*.

73 MEPC 101/48, *Identification of the Wadden Sea as a Particularly Sensitive Sea Area*.

74 MEPC 106/49, *Designation of the Paracas National Reserve as a Particularly Sensitive Sea Area*.

7 the Galapagos Archipelago in Ecuador, designated in 2005;[75]
8 the Baltic Sea, proposed by Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden and designated in 2005;[76]
9 the Canary Islands, proposed by Spain and designated in 2005;[77]
10 the Western European PSSA, proposed by Belgium, France, Ireland, Portugal, Spain and the United Kingdom and designated in 2004;[78]
11 the Papahānaumokuākea Marine Natural Monument, proposed by the United States of America and designated in 2007;[79]
12 the Strait of Bonifacio, proposed by France and Italy and designated in 2011;[80]
13 the Saba Bank in the Caribbean Sea, proposed by the Netherlands and designated in 2012.[81]

In May 2006 the MEPC adopted a Guidance Document for the Submission of PSSA Proposals to IMO.[82] This document brought clarification as to the method of assessing the potential harm that international shipping may cause to an area. States proposing a marine area for the status of PSSA must indeed indicate that 'the area [has] certain attributes (ecological, socio-economic, or scientific)'.[83] In addition, 'the area must be vulnerable to damage by international shipping activities'.[84] Finally, there 'must be a measure with an identified legal basis that can be adopted by IMO to prevent, reduce, or eliminate risks from these activities'.[85] Read in a precautionary framework, these three conditions reflect the implementation of the precautionary principle in other areas,[86] where the first step is the identification of a value that the environment represents for States. Here, the condition of identification of ecological, socio-economic or scientific attributes of a marine area can be seen as representing the value that the State sees in it.

75 MEPC 135/53, *Designation of the Galapagos Archipelago as a Particularly Sensitive Sea Area*.
76 MEPC 136/53, *Designation of the Baltic Sea as a Particularly Sensitive Sea Area*.
77 MEPC 134/53, *Designation of the Canary Islands as a Particularly Sensitive Sea Area*.
78 MEPC 121/52, *Designation of the Western European waters as a Particularly Sensitive Sea Area*.
79 MEPC 171/57, *Designation of the Papahānaumokuākea Marine Natural Monument as a Particularly Sensitive Sea Area.*
80 MEPC 204/62, *Designation of the Strait of Bonifacio as a Particularly Sensitive Sea Area*.
81 MEPC 226/64, *Designation of the Saba Bank as a Particularly Sensitive Sea Area*.
82 MEPC.1/Circ.510, 10 May 2006, Guidance document for submission of PSSA proposals to IMO, which superseded MEPC, Circ. 398 of 27 March 2003.
83 Ibid., para. 1.2.
84 Ibid.
85 Ibid.
86 See above, Chapter 4.

5.2.1.4 Threshold of required environmental sensitivity

An examination of the documents supporting applications for the designation of PSSAs in different parts of the world shows a lack of consistency in fulfilling the criteria of the PSSA Guidelines. While all the headings are addressed, the detail of the scientific data concerning the areas, the level of analysis of the impact of shipping on these areas, and the mention of environmental assessments are not provided in a uniform manner. However, it seems that the marine areas that are already the object of thorough scientific research and environmental protection measures are described with more accuracy, and the necessity to designate them as PSSAs and to apply Associated Protective Measures appears more clearly.

A first general comment is that nearly all sea areas proposed for PSSA designation are already under a scheme of environmental protection. The Secretary General of the IMO emphasised the importance for PSSAs of other means of marine areas protection, referring to several international and regional conventions.[87] Thus, marine protected areas should be added to the World Heritage list under the 1972 Convention concerning the Protection of the Cultural and Natural Heritage;[88] wetlands should be designated under the 1971 Convention on Wetlands of International Importance;[89] habitats should be protected under the 1979 Convention on the Conservation of Migratory Species of Wild Animals;[90] biosphere reserves should be identified under the Man and Biosphere Programme of the United Nations Educational, Scientific, and Cultural Organization (UNESCO); Special Areas may be designated under MARPOL 73/78, and under article 211(6) of UNCLOS. A number of regional conventions also provide for mechanisms for the protection of special marine areas, in particular under the aforementioned UNEP Regional Seas Programme. Marine protected areas may also be designated under the 1940 Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere,[91] the 1968 African Convention on the Conservation of Nature and Natural Resources,[92] the 1979 Convention on the

87 *Identification and Protection of Special Areas and Particularly Sensitive Sea Areas, Additional Protection for Particularly Sensitive Sea Areas (PSSAs)*, note by the Secretariat, MEPC 46/6/1,19 January 2001.

88 1972 UNESCO Convention Concerning the Protection of the World's Cultural and Natural Heritage, 11 *ILM* (1972) 1358, in force 17 December 1975.

89 1971 Convention on Wetlands of International Importance (Ramsar), 11 *ILM* (1972) 963, in force 21 December 1975.

90 1979 Convention on the Conservation of Migratory Species of Wild Animals (Bonn), 19 *ILM* (1980) 15, in force 1 November 1983.

91 1940 Convention on Nature Protection and Wild-Life Preservation in the Western Hemisphere (Washington), 161 *UNTS* 193, in force 1 May 1942.

92 1968 African Convention on the Conservation of Nature and Natural Resources (Algiers), 1001 *UNTS* 4, in force 16 June 1969.

Conservation of European Wildlife and Natural Habitats,[93] the 1980 Convention on the Conservation of Antarctic Marine Living Resources,[94] and the 1992 OSPAR Convention. Under EU Law, the 1979 Wild Birds Directive and the 1992 Habitats Directive require the designation of Special Areas of Conservation (SACs) and of Special Protection Areas (SPAs) on the territory of the Member States. By protecting marine areas against threats posed by international shipping, PSSAs therefore become complementary to other instruments of marine environmental protection.

Several of the PSSAs considered for identification by the MEPC include various types of marine protected areas. In Europe, for instance, certain parts of the Wadden Sea, which was approved for designation by the MEPC in 2002, are protected as SACs under the EU Habitats Directive, SPAs under the EU Wild Birds Directive, Wetlands of International Importance under the 1971 Ramsar Convention, and UNESCO Man and Biosphere Reserves.[95] In the Baltic Sea Area, which was proposed for designation in December 2003,[96] there were already 62 Baltic Sea Protected Areas (BSPAs) in the HELCOM Framework and the Commission was considering the designation of 24 further offshore areas as BSPAs. The protection of marine areas by HELCOM is coordinated with the European network Natura 2000 and the work of the OSPAR Commission. A number of SACs and SPAs are present in the Baltic Sea. HELCOM has also adopted a Red List of Marine and Coastal Biotopes in 1998, and a Recommendation on general biotope protection in 2000.[97] Finally, the Baltic Sea area is designated under MARPOL 73/78, Annexes I, II, V and VI, which means that strict no-discharges rules of the relevant pollutants apply. The Canary Islands were also proposed for designation as a PSSA.[98] Several parts of the Canary Islands are designated as Biosphere Reserves under the UNESCO programme. In addition, 24 areas are protected as SACs under the EU Habitats Directive. The proposal for application shows that there are more than 300 protected spaces in the Canary Islands, including four national parks, seven rural parks, 11 integrated marine reserves, 15 special natural reserves, two marine reserves, 27 SPAs,

93 1979 Convention on the Conservation of European Wildlife and Natural Habitats (Berne), *UKTS* 56 (1982), in force 1 June 1982.

94 1980 Convention on the Conservation of Antarctic Marine Living Resources (Canberra) 19 *ILM* (1980) 837, in force 7 April 1981.

95 See *Identification and Protection of Special Areas and Particularly Sensitive Sea Areas, Designation of the Wadden Sea as a Particularly Sensitive Sea Area,* submitted by Denmark, Germany and the Netherlands, MEPC 48/7/2, 28 June 2002.

96 See *Identification and Protection of Special Areas and Particularly Sensitive Sea Areas, Designation of the Baltic Sea Area as a Particularly Sensitive Sea Area*, submitted by Denmark, Estonia, Germany, Latvia, Lithuania, Poland and Sweden, MEPC 51/8/1, 19 December 2003.

97 HELCOM Recommendation 21/4.

98 See *Identification and Protection of Special Areas and Particularly Sensitive Sea Areas, Designation of the waters of the Canary Islands as a Particularly Sensitive Sea Area*, proposal submitted by Spain, MEPC 51/8, 24 October 2003.

11 natural parks, 19 sites of scientific interest and 27 protected landscapes. The proposal put forward by Peru to designate the Paracas National Reserve[99] is a further example of the importance of the presence of areas already protected under international or national environmental schemes. Indeed Peru requested and obtained the designation of an area that is entirely identified as a national reserve. The Paracas National Reserve was designated under Peruvian law in 1975. It was also designated as a Wetland of International Importance under the Ramsar Convention, and it is a Regional Reserve for Migratory Birds within the Hemispheric Shorebird Reserve Network.[100] The ecological criteria of the most recent PSSA, the Strait of Bonifacio, are almost exclusively described with reference to such schemes, including, inter alia, a Specially Protected Area of Mediterranean Importance (SPAMI) under the Barcelona Convention for the Protection of the Mediterranean Sea against Pollution, nature reserves under French environmental legislation, Natura 2000 sites and national parks under Italian legislation.[101]

The national, regional or international recognition of the ecological importance of parts of an area proposed as a PSSA is highlighted by States in their application. This is complementary to the description of the ecological features of the areas in question according to the 11 criteria of Resolution A.982(24). While it does not appear to be a necessary condition that the entire area should benefit from a special environmental protection regime, all applications lodged to the MEPC so far refer to such protection. This de facto consensus could be an indication of the threshold of environmental sensitivity of marine areas that coastal States seek to designate as PSSAs. However, it should be noted that such a threshold would not be uniform, as the conditions of designation of marine protected areas under the above-mentioned conventions are by no means unified and consistent, and vary considerably.

5.2.1.5 PSSAs as ecosystems

The second remark to make about the applications for PSSA designation is that they generally describe the area as a coherent ecosystem. For instance, this is the case for the Baltic Sea Area, the Wadden Sea Area, the Great Barrier Reef, the Torres Strait,[102] the Galapagos Islands,[103] and the Paracas

99 *Identification and Protection of Special Areas and Particularly Sensitive Sea Areas, Designation of the marine area of the Paracas National Reserve as a Particularly Sensitive Sea Area*, submitted by Peru, MEPC 48/7, 18 April 2002.

100 Ibid., p. 2.

101 MEPC 204/62, above, note 80, pp. 4–5.

102 *Identification and Protection of Special Areas and Particularly Sensitive Sea Areas, Extension of Existing Great Barrier Reef PSSA to include the Torres Strait Region*, submitted by Australia and Papua New Guinea, MEPC 49/8, 10 April 2003.

103 *Identification and Protection of Special Areas and Particularly Sensitive Sea Areas, designation of the Galapagos Archipelago as a Particularly Sensitive Sea Area*, submitted by Ecuador, MEPC 51/8/2, 24 December 2003.

National Reserve. The reference to ecosystems generally falls under the criterion of 'uniqueness or rarity'. The Baltic Sea area is described as a 'globally unique and sensitive northern brackish-water ecosystem with extraordinary environmental conditions'.[104] The Wadden Sea is 'the largest European wetland ecosystem, with the greatest biological dynamics. As such it is the only one of its kind.'[105] The Torres Strait is the extension of the Great Barrier Reef, which is 'the largest coral reef system in the world', and is a 'unique marine ecosystem'.[106] In the Galapagos archipelago, there are several ecosystems, recognised worldwide and known as the source of inspiration of Darwin's theory of human evolution. The uniqueness of the ecosystems of the Galapagos archipelago is due to 'the geographical isolation and widespread nature of the islands [that] have influenced the distribution and evolution of the species that exist there, creating biogeographic zones'.[107] A high diversity of fauna and flora, a high degree of endemism and high phyto- and zoogeographical affinity characterise the marine ecosystems of the archipelago. The Galapagos marine area features the most historic, scientific and well-known examples of ecosystems. The original Paracas National Reserve includes both land and sea areas, typical of the biogeographical areas of the Pacific subtropical desert and of the Pacific temperate desert. The marine ecosystem that is sought to be preserved as a PSSA forms part of these biogeographical areas.[108] The Canary Islands includes 'unique volcanic tubes and lava bubbles, and unique and representative geomorphological formations with a high level of endemisms', and 'the "sebadales", biologically rich meadows of spermatophytes that play an important role in the breeding and nutrition of bentonic organisms'.[109] The Papahānaumokuākea Marine Natural Monument 'supports a unique, dynamic coral reef ecosystem, which, thanks to its relative isolation, is among the healthiest in the world'.[110]

The notion of ecosystem is therefore central to the identification of PSSAs. In fact the 11 ecological criteria, which must be fulfilled to address the ecological significance of an area, all relate to the ecosystem(s) contained in the area. This was the original intention of the IMO when it introduced the concept of PSSA. A consequence of the application of the notion of ecosystem is that there does not seem to be a limit to the size of an area proposed as a PSSA. Arguably, as long as a proposed PSSA constitutes a coherent ecosystem, or a group of ecosystems, the size should not be an obstacle to its designation.

The legal basis of the concept of PSSAs is not unanimously agreed upon, but one theory is that it is an application of the sensitive sea areas that may

104 MEPC 51/8/1, above, note 96, p. 3.
105 MEPC 48/7/2, above, note 95, p. 3.
106 MEPC 49/8, above, note 102, p. 3.
107 MEPC 51/8/2, above, note 103, p. 3.
108 MEPC 48/7, above, note 99, pp. 3–5.
109 MEPC 51/8, above, note 98, p. 3.
110 MEPC 171/57, above, note 79, p 7.

be designated by coastal States under article 211(6) of UNCLOS. Article 211(6) does not explicitly refer to the notion of 'ecosystem' as such, but to the 'oceanographical and ecological conditions, as well as utilization or the protection of its resources and the particular character of its traffic' of a 'particular, clearly defined area of their exclusive economic zone'. These features could be interpreted in light of the notion of 'ecosystem', which has emerged in international environmental law, as it is accepted practice to interpret conventions and treaties in light of contemporaneous international environmental law.[111] In this respect, mention can be made of the International Court of Justice's judgement in the *Gabcikovo-Nagymaros Case*. The ICJ held that 'newly developed norms of international environmental law are relevant for the implementation of [a pre-existing] Treaty',[112] and that '[a] Treaty is not static, and is open to adapt to emerging norms of international law.'[113]

The insertion of the notion of 'ecosystem' in the interpretation of relevant provisions of UNCLOS could have important consequences for the definition of the rights and powers of coastal States. Indeed, ecosystems in the marine environment are not determined along the boundaries established by UNCLOS, namely internal waters, territorial sea, contiguous zones, EEZ and high sea. They are defined by biological and physical criteria. For environmental protection purposes it might therefore be beneficial to interpret the relevant provisions of UNCLOS in light of the ecosystem approach.

The ecosystem approach for the identification of PSSAs is facilitated when the area in question is the object of systematic and organised scientific research, either at State level or in a regional cooperative framework for environmental protection. The in-depth knowledge of the parameters relating to the ecosystems in question helps in identifying the precise threats of environmental damage and their sources, as well as the levels of risk of damage. It is also necessary to design adequate measures to protect the marine environment of the area in question against such risks. For instance, as shown above in Chapter 4, pollution of the Baltic Sea area is regulated by the 1992 Helsinki

111 de La Fayette, L., 'The Marine Environment Protection Committee: The Conjunction of the Law of the Sea and International Environmental Law' (2001)16(2) *International Journal of Marine and Coastal Law* 155, pp. 191–2. This notion should be linked to the ecosystem approach; see above, Chapter 4.

112 *Gabcikovo-Nagymaros Case (Hungary v. Slovakia)* [1997] ICJ Rep. 7, at para. 112.

113 Ibid. On this point it should be noted that, on the particular facts of this case, the Court seemed to have been influenced, in making this statement, by the fact that the treaty which was the object of contention between the parties contained explicit provisions allowing for adaptation and evolution in its implementation. These provisions, in the eye of the Court, allow for evolution in the light of evolving international environmental law, but only on the basis of negotiation between the parties, carried out in good faith. The Court rejected Hungary's argument that it was entitled to unilateral termination of the Treaty on the ground that its implementation would breach certain new norms of environmental law.

Convention on the Protection of the Marine Environment of the Baltic Sea Area,[114] which provides a comprehensive framework dealing with marine, land-based and atmospheric pollution. The Helsinki Commission (HELCOM) has carried out research studies on the various types of pollutants that damage the Baltic Sea. This provides accurate and reliable data on the types and sources of pollution of the defined ecosystem of the Baltic Sea. The ecosystem itself is well understood and documented by the scientific community. The Torres Strait has been studied by the Australian Commonwealth Scientific and Industrial Research Organisation. In addition, a treaty signed between Australia and Papua New Guinea, the 1985 Torres Strait Treaty, defines the parties' rights and responsibilities in the use of the strait. The Great Barrier Reef Marine Park Authority has also carried out a study on the strait. Similarly, since 1982 the Wadden Sea has been managed according to principles and rules common to the three coastal States bordering it, the Netherlands, Germany and Denmark.[115] Scientific assessments of the ecosystem of the Wadden Sea area were carried out in cooperation by these three States. The knowledge of the state of the marine environment in a particular marine area and of the types and risks of damage also allows the coordination of different types of counter-pollution measures. This is complementary to the ecosystem approach by allowing the adoption of adequate and complementary measures against land-based, atmospheric and marine pollution for the preservation of the ecosystem in question. As aforementioned[116] the regional application of UNCLOS is often achieved through regional seas agreements, such as the Helsinki Convention, or the Regional Seas Conventions concluded under UNEP's Regional Seas Programme. The precautionary principle is a basis for decision-making within these regional arrangements. By inserting the concept of PSSAs in the more general background of environmental management of given ecosystems, States are also ensuring that the precautionary principle applies to vessel-source pollution.

A further remark to make about the identification of PSSAs is that they are not confined within the jurisdictional limits of coastal States. The PSSA Guidelines do not specify that PSSAs should be confined to the limits of the territorial sea or EEZ of coastal States. It is therefore conceivable that PSSAs could be identified in the high seas.

5.2.1.6 Practical risk assessment of international shipping

The second step in the identification of PSSAs is the assessment of their vulnerability to damage from shipping activities. Resolution A.982(24) and

114 Above, note 31.

115 Joint Declaration on the Protection of the Wadden Sea, 1982, Trilateral Wadden Sea Plan.

116 Above, Section 1.3 in Chapter 3.

the 2006 Guidance document indicate that this assessment must be done by reference to the 'Vessel traffic characteristics' and to the 'Natural factors' of the areas concerned. In their applications, States must indicate why the marine and coastal areas that they wish to designate as PSSAs are particularly at risk from international shipping.

Upon requesting a PSSA identification, States generally provide a well-documented description of the hydrographical, meteorological and oceanographic factors that characterise the areas considered. Significantly, these characteristics relate to the defined ecosystem of the proposed PSSA. The hydrographical factors deal with the average depth of the area, which is for instance relatively shallow in the Baltic, with 53 metres on average.[117] They also detail the nature of the bodies of water, which can be salt water or brackish water. The meteorological and oceanographic factors deal with the water temperature, winds and atmospheric precipitations. A significant example is found in the application for the designation of a Western European PSSA.[118] In the Bay of Biscay, English Channel and North Sea, the 'general meteorological system [. . .] leads to frequent periods during which the conditions are not very favourable for navigation'.[119] Furthermore, it is advanced that 'the frequency of winds higher than Force 7 is relatively high and the configuration of the seabed, combined with strong currents present in this area, often create a rough and narrow sea, which may in certain conditions impede the normal sailing of small ships and causes stress in the hull structure of the older or less maintained ships'.[120] The natural factors are therefore very important to assess the danger to navigation in PSSAs. They highlight the particular dangers to navigation presented by the area in question.

Maritime traffic is described against the background of the natural dangers of the areas. The predicted evolution of the traffic is also taken into account. For instance, the Baltic Sea area is used for the transportation of about 160 million tons of oil per year, but this traffic is expected to increase by 40 per cent by the year 2015.[121] During the winter the Baltic is covered with between 12–100 per cent of ice, thus rendering navigation extremely hazardous. In addition, rapid drifts of ice may occur, thus increasing the dangers to navigation. Traffic characteristics are described in terms of volumes of traffic, size and nature of the vessels, nature of the cargo transported (especially if they are hazardous cargoes) and international importance of the area. In relation to the latter point, relating to the importance for international shipping of the proposed PSSA, it must be noted that it is not an absolute factor, but

117 MEPC 51/8/1, above, note 96, p. 13.

118 *Identification and Protection of Special Areas and Particularly Sensitive Sea Areas, Designation of a Western European Particularly Sensitive Sea Area*, submitted by Belgium, France, Ireland, Portugal, Spain and the United Kingdom, MEPC 49/8/1, 11 April 2003.

119 Ibid., p. 38.

120 Ibid.

121 MEPC 51/8/1, above, note 96, p. 13.

it is rather assessed with regard to the ecological sensitivity and the economic importance of the area. For instance, some 65,000 ships per year enter the Baltic via the Kadet trench,[122] in contrast to about 1,008 vessels that were recorded by the Australian authorities to have used the Torres Strait from November 2001 to November 2002.[123]

The environmental damage that a maritime casualty would cause to a PSSA must be addressed, according to Resolution A.982(24) and the 2006 Guidance document. However, in the absence of precise criteria this assessment is not carried out consistently throughout the PSSA applications. The threat of damage to the biodiversity seems recurrent in most applications. For instance, it is noted that 'the increase in shipping in the vicinity of the [Paracas] Reserve adds to the chance of accidents such as collisions, groundings or other accidents which could seriously endanger the present biodiversity in the Reserve and affect its natural wealth.'[124] In the Galapagos, the threat comes from 'a variety of pollutants which directly affect marine biodiversity and the large number of protected species that live on land but rely on the sea for food'.[125] Interestingly, Australia and Papua New Guinea address the issue of damage to the marine environment by assessing the harm it would cause to indigenous populations: 'The extremely high cultural, social and economic significance of marine resources to the people of Torres Strait could lead, in the event of an oil or chemical spill, to a total failure of their subsistence fisheries and abandonment of affected islands . . . until the marine ecosystem re-established itself.'[126] A similar mention of a population highly dependent on the marine ecosystem for their culture and identity is made in relation to the Baltic Sea. The Livs, in Latvia, have a way of life totally dependent on fishing, and Liv villages 'have a unique heritage'[127] of traditions, language, and historic and cultural places.

The nature and variety of pollutants is also referred to in many applications. In the Torres Strait, the threats come from oil and chemical spills, but also from TBT antifouling paints, which may be abraded from the hulls of grounded ships and may have in very small quantity a severe impact on the local ecosystem. In the Wadden Sea, the threats arise from oil and chemicals that may be washed ashore, and from containers lost overboard. In the Galapagos, the threats come from oils, harmful liquids, sewage water, garbage of all kinds, paints, foreign organisms and harmful solids, as well as radioactive waste. In the Paracas National Reserve, the threat of damage arises

122 Ibid., p. 11.
123 MEPC 49/8, above, note 102, p. 13.
124 MEPC, 48/7, above, note 99, p. 16.
125 MEPC, 51/8/2, above, note 103, p. 12.
126 MEPC 49/8, above, note 102, p. 15.
127 MEPC 51/8/2, above, note 103, p. 9. The document refers to the Livs under the 'human dependency' criterion of ecological sensitivity of the Baltic Sea area, and not in assessing the potential harm of maritime traffic.

from oil, sulphuric acid, bilge water, sewage and waste. PSSA applications often refer to past examples of maritime casualties that have severely affected their fauna (in particular, mention is made of thousands of oiled birds), flora and economic interests (for instance, the fall in tourism in the French regions of Poitou-Charentes, Pays de la Loire and Brittany, due to the *Erika* disaster, is estimated to have cost between 310–385 million Euros in 2000 alone).[128]

5.2.1.7 A new balance of powers in favour of coastal States

The multiplication of applications for the identification of PSSAs was a cause of concern among certain States and interest groups in the shipping industry, and led to the adoption of the 2005 Guidelines and 2006 Guidance document. In early 2004, the lack of specificity in the identification process, under both Resolution A.927(22) and the MEPC Guideline Document of 2003, was raised at the 51st session of the MEPC. Liberia, Panama and Russia, which are acknowledged to be important shipping nations, submitted comments to the MEPC on 23 January 2004.[129] They were supported shortly afterwards by a group of associations,[130] BIMCO (the world's largest international shipping association, representing 65 per cent of the world's merchant fleet, or 525 million tons dwt), the International Chamber of Shipping (ICS),[131] INTERCARGO,[132] INTERTANKO,[133] OCIMF[134] and the International Parcel Tankers Association (IPTA).[135] The concerns of these States and professional associations relate to the designation process of PSSAs. Indeed, it was noted that the very concept of PSSA was not linked to any international convention, but relied solely on the IMO Assembly Resolution A.927(22). The designation process, which was in two steps, including the assessment of environmental sensitivity of an area and the adoption of associated protective measures, was, it was submitted, wholly inadequate. The 'non-specific language of the guidelines' led to different interpretations throughout the years and by different countries.

128 MEPC 49/8/1, above, note 118, p. 43.

129 *Comments on the Guidelines for the Designation of Special Areas under MARPOL 73/78 and the Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas*, submitted by Liberia, Panama and the Russian Federation, MEPC 51/8/3, 23 January 2004.

130 *Comments on the Guidelines for the Designation of Special Areas under MARPOL 73/78 and the Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas*, submitted by BIMCO, ICS, INTERCARGO, INTERTANKO, OCIMF, and IPTA, MEPC 51/8/4, 4 February 2004.

131 ICC, IMO Consultation Status.

132 International Association of Dry Cargo Shipowners. INTERCARGO has IMO Consultation Status.

133 International Association of Independent Tanker Owners. INTERTANKO also has IMO Consultation Status.

134 Oil Companies International Marine Forum, an international association of 47 oil companies, IMO Consultation Status.

135 IMO Consultation Status.

The concept of PSSA in itself is of significant importance in the context of the law of the sea, because it considerably extends the powers of coastal States to monitor foreign ships passing along their coasts, on the basis of environmental criteria. It was therefore of high concern to these States and to the shipping industry that such an extension of powers could be done on the basis of vaguely defined criteria and according to an uncertain procedure. They submitted further that the identification and designation of PSSAs should only occur when measures for the regulation of maritime traffic already in place have been thoroughly assessed and it has been shown that they are insufficient to protect the area in question against particular threats posed by international shipping. In effect, the two groups proposed here to place the burden of proving that extra protective measures are necessary on the applicant coastal States. According to the comments submitted to the MEPC, the designation process should:

> place considerable emphasis on why the application [sic] feels that the sea areas cannot be adequately protected by the existing measures under MARPOL and through routeing measures. Evidence should also be provided that all of the available measures short of PSSA designation have been adopted, given a reasonable period of assessment, but still found wanting.[136]

Furthermore, the Associated Protective Measures should be proportional to the environmental risk, and should be accompanied by measures against other sources of pollution, such as land-based source pollution. It is noted that the general principle of proportionality should inform the assessment of the suitability of APMs. The ICJ gave a definition of this principle in the *Gabcikovo-Nagymaros Case*: '[the] effects of a counter measure must be commensurate with the injury suffered, taking into account the rights in question.'[137] Article 3 of the International Law Commission's 2001 Draft Articles on the Prevention of Transboundary Harm from Hazardous Activities[138] is also relevant in defining the proportionality principle, by requiring States to 'take all appropriate measures to prevent significant transboundary harm or at any event to minimise the risk thereof'. 'Significant transboundary harm' is defined in Article 2 of the Draft Articles as a 'high probability of causing significant transboundary harm and a low probability of causing disastrous transboundary harm'. States' measures must therefore be proportional to the degree of risk of particular harm.

The submission of these comments to the MEPC by maritime States and by representatives of the shipping industry highlighted the significance of the

136 *Comments*, above, note 130, para. 6.
137 *Gabcikovo-Nagymaros Case*, above, note 112, at para. 85.
138 Report of the ILC on its 53rd Session, p. 379. See also above, Chapter 3.

concept of PSSAs for the balance of powers between coastal States and flag States. It was preceded the same year by two applications by European coastal States to designate respectively a PSSA in Western Europe, from northern Scotland to southern Portugal, and in the Baltic Sea. The approval of these PSSAs would mean an official acknowledgment in Europe of the environmental sensitivity of the corresponding sea areas and of their vulnerability to international shipping. It would also mark a symbolic and significant extension of jurisdictional powers of coastal States, and the parallel weakening of the historic rights of maritime nations in European coastal areas. The application for a Western Europe PSSA was, from this point of view, particularly significant. Indeed, it was lodged by a group of six States, who were seeking the designation of the entire approach to the European coasts as a PSSA. The APM that was requested was the right for these coastal States to ban single-hull oil tankers from this PSSA. It should be noted that this application followed a number of recent maritime ecological catastrophes, from the *Torrey Canyon* in 1967, the *Amoco Cadiz* in 1978, to the *Prestige* and the *Tricolor* in 2002, which caused a total of 1,212,600 tons of oil to be spilt at sea and on the Western European coasts.[139] The area considered was immense, from northern Scotland to southern Portugal, including the English Channel, and did not present the features of a single ecosystem. Rather it comprised several types of ecosystems in different maritime climatic and biogeographic regions. The concern of flag States was that this application seemed to reflect more the desire of coastal States to be able to legally monitor maritime traffic along their coasts than their intention to protect an environmentally sensitive ecosystem.

The same year, in 2004, the USA put forward a proposal for amendments to the existing PSSA guidelines.[140] In essence the USA was proposing to amend the guidelines in four principal areas:

1 strengthening the identification criteria;
2 establishing a link between the vulnerability of an area and proposed Associated Protective Measures (APMs);
3 requiring a formal legal basis for APMs;
4 streamlining the procedure by which an area is designated as a PSSA.

The World Wide Fund for Nature (WWF) reacted to this proposal by claiming that several of the proposed amendments would have the effect of withdrawing the precautionary principle as the basis for PSSA designation and

139 MEPC 49/8/1, above, note 118, Annex 2, p. 4.

140 *Identification and Protection of Special Areas and Particularly Sensitive Sea Areas, Proposed Amendments to Assembly Resolution A.927(22) to Strengthen and Clarify the Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, submitted by the United States*, MEPC 52/8, 9 July 2004.

APM adoption.[141] WWF first considered that the new definition of criteria proposed by the USA was too restrictive to allow the application of the precautionary principle. The representativeness of an area was proposed to be assessed regionally: this would not allow States to claim that a marine area is representative of a national type of ecosystem.[142] The criterion of diversity was proposed by the USA to be defined as 'unique', whereas the use of the term 'significant' would be less restrictive.[143] Naturalness should not be described as the 'pristine' condition of an area, but 'near pristine', as very few areas can actually be considered untouched by mankind.[144] The most important criticism by WWF of the American proposal was that the wording used indicated a requirement of strong evidence of the presence of the criteria in proposed areas. This approach was considered by WWF as inconsistent with the precautionary principle, which does not require evidence, but mere suspected criteria.[145] It is argued that the two positions of the USA and WWF are not irreconcilable. Indeed, an application of the precautionary principle requires the identification of the value that a particular area represents for coastal States, rather than no declared value at all. The American proposal to require criteria of identification, if based on values, can be easy to meet. For example, in their own 2007 proposal for designation of the Papahānaumokuākea Marine Natural Monument as a PSSA, the USA undoubtedly show the value that they attach to this marine area in the Hawaiian Islands. The American application for PSSA status specifically refers to the 2006 President Bush Proclamation relating to this area,[146] which states that 'it would be in the public interest to preserve the marine area' of Papahānaumokuākea. WWF further criticised the American proposal to assess the vulnerability of a marine area to impacts from international shipping by requiring 'any evidence that international shipping activities are causing or may cause damage to the attributes of the proposed area, including the significance of the damage, the degree of harm that may be expected to cause damage, and that such damage is reasonably foreseeable, as well as whether damage is of a recurring or cumulative nature'.[147] WWF contended that without a reference to the necessity to weigh the risks of damage, the

141 *Identification and Protection of Special Areas and Particularly Sensitive Sea Areas, Proposed Amendments to Assembly Resolution A.927(22) to Strengthen and Clarify the Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, Comments on MEPC 52/8*, submitted by WWF, MEPC 52/8/4, 18 August 2004.

142 MEPC 52/8/4, above, note 141, para. 5.

143 Ibid., para. 6.

144 Ibid., para.7.

145 Ibid., para. 8.

146 Establishment of the Northwestern Hawaiian Islands Marine National Monument, Presidential Proclamation, 15 June 2006, available at: http://www.gc.noaa.gov/documents/061506-monu_pres_proc.pdf. As amended by Proclamation of 2 March 2007, available at: http://www.gc.noaa.gov/documents/030207-monu_proc_3207.pdf

147 MEPC 52/8, above, note 140, p. 8.

degree of threatened harm or the foreseeability of the damage, the US proposal would no longer have a precautionary character.

The principal change inserted by the new criteria of 2005 was that the APMs that accompany the PSSAs must have an identified legal basis. It is still possible for coastal States to propose new types of APMs, but they must only do so within the appropriate legal framework and seek their approval or adoption by the IMO.[148] This has certainly reduced the possibility for the MEPC to adopt Associated Protective Measures loosely based on UNCLOS, but one can argue that this did not diminish the influence of the precautionary principle on the PSSA legal framework. The emergence of the concept of PSSAs stemmed from the incorporation of the precautionary principle into IMO activities. It can be argued that the increased number of PSSAs designated by the IMO has had the effect of passing on to coastal States the benefits of the application of the precautionary principle. On the basis of the principle adopted by the IMO through the concept of PSSAs, coastal States are now entitled to apply precautionary measures to regulate international shipping with a view to protecting their marine and coastal environment against risks of pollution from ships. In the process, they must demonstrate the value that certain coastal and marine areas represent for them (the significance of the area). This is the first step in implementing the precautionary principle. In the context of the law of the sea, this development is significant, because it means that the balance of powers between coastal States and flag States has evolved for a genuine reason, i.e. the necessity to take into account certain environmental considerations which were until then not adequately addressed.

5.2.2 Ships' Routeing Measures in marine protected areas

5.2.2.1 Purpose of Ships' Routeing Measures and role of the precautionary principle

The designation of Ships' Routeing Measures (SRMs) is another tool at the disposal of coastal States to regulate maritime traffic along their coasts. This section will attempt to show that, by being taken on the basis of environmental factors, such measures can be considered as an application of the precautionary principle.

A number of coastal States have adopted legislation designating certain marine areas within their jurisdiction, and to which navigational restrictions apply. These measures must, however, abide by international law, which in particular seeks to preserve the freedom of the high seas and of innocent passage, which are rights enjoyed by all ships sailing in the territorial sea or high seas. The dilemma therefore for coastal States is to enact legislation aimed at the protection of environmentally sensitive marine areas, while

148 2006 Guidance document, above, note 48, para. 3.5.1.2.

staying in compliance with international rights and obligations. The adoption of SRMs is a way for coastal States to monitor international shipping with the approval of the International Maritime Organisation.

The role of the precautionary principle is not explicit in the adoption of ships' routeing measures, but it is advanced that it is nonetheless significant. It is so in the process of adoption of such measures, which requires scientific evidence of the special need of protection. It is also significant in giving a uniform, international and common set of conditions for the application of navigational restriction measures to certain areas of the oceans. One author noted, 'in general it can be said that the real value of navigation restriction or prohibition is its preventive effect.'[149] It could be further said that navigation restriction or prohibition is indeed precautionary.

5.2.2.2 Regulation of navigation under UNCLOS

The provisions in UNCLOS relating to the regulation of the freedom of innocent passage can be interpreted in such a way as to allow coastal States to adopt certain routeing measures for environmental protection purposes. Article 17 of UNCLOS states that 'ships of all States, whether coastal or landlocked, enjoy the right of innocent passage through the territorial sea'. This right can of course be regulated by coastal States, subject to the respect of certain conditions. Article 21 indeed states that:

(1) The coastal State may adopt laws and regulations, in conformity with the provisions of this Convention and other rules of international law, relating to innocent passage through the territorial sea, in respect of all or any of the following:
    (a) the safety of navigation and the regulation of maritime traffic;
    (d) the conservation of living resources of the sea;
    (f) the preservation of the environment of the coastal State and the prevention, reduction and control of pollution thereof;
(2) Such laws and regulations shall not apply to the design, construction, manning or equipment of foreign ships unless they are giving effect to generally accepted international rules or standards.

In addition, Article 22 of UNCLOS specifically gives the right to coastal States to adopt sea lanes and traffic separation schemes in their territorial sea:

> The coastal State may, where necessary having regard to the safety of navigation, require foreign ships exercising the right of innocent passage through its territorial sea to use such sea lanes and traffic separation schemes as it may designate or prescribe for the regulation of the passage of ships.

149 Spadi, F., 'Navigation in Marine Protected Areas: National and International Law (2000)', 31 *Ocean Development and International Law* 285, p. 286.

The safety of navigation is the primary reason for a coastal State to install sea lanes or Traffic Separation Schemes. Indeed Article 22(3) requires that coastal States have consideration for 'channels customarily used for international navigation', as well as 'the special characteristics of ships and channels', and 'the density of traffic' when taking such measures. However, other sources of international law concerning ships' routeing have evolved to include environmental grounds for such measures. Therefore legal justifications of such measures are not limited to the safety of navigation, but they also include environmental justifications, on the basis of the precautionary principle.

5.2.2.3 Regulation of navigation on environmental grounds in SOLAS

The SOLAS Convention specifically mentions in Regulation 10 (Routeing) of Chapter V (Safety of Navigation)[150] that 'Ships' routeing systems contribute to safety of life at sea, safety and efficiency of navigation, and/or protection of the marine environment.' Routeing measures may be adopted by coastal States unilaterally, but they should be taken in application of the guidelines and criteria developed by the IMO. In particular, such measures 'may be made mandatory . . . when adopted and implemented in accordance with the guidelines and criteria developed by the Organization'.[151] The IMO is indeed the only recognised authority to draft 'guidelines, criteria and regulations on an international level for ships' routeing systems'.[152]

In this respect, the IMO has adopted Resolution A.572(14) on General Provisions on Ships' Routeing (GPSR),[153] which provides guidelines on the applicable criteria and procedures to governments willing to establish ships' routeing measures in sea areas under their jurisdiction. In January 2003 the Maritime Safety Committee (MSC) of the IMO adopted a 'Guidance note on the Preparation of Proposals on Ships' Routeing Systems and Ship Reporting Systems for Submission to the Sub-Committee on Safety of Navigation',[154] as a complementary note to Resolution A.572(14) and to SOLAS Regulation V.10. According to this note, proposals by individual States to establish ships' routeing measures should include a summary of the objectives of such systems. This summary should state the 'demonstrated need' for the routeing

150 Chapter V, Regulation 10, 'Ships' routeing', International Convention for the Safety of Life at Sea, 1974, and 1988 Protocol relating thereto, 2000 Amendments (International Maritime Organisation, 2001).

151 Regulation 10(1) of Chapter V of SOLAS, above, note 150.

152 Ibid.

153 *General Provisions on Ships' Routeing (GPSR)*, IMO Assembly Resolution A.572(14), 20 November 1985, as amended by Resolution A.827(19), 23 November 1995, and last by MSC.280(85), 1 December 2008, at: http://www.imo.org/blast/blastDataHelper.asp?data_id=24854&filename=280(85).pdf

154 MSC/Circ.1060, 6 January 2003, Ref. T2/8.03, available on the IMO website at: www.imo.org

system, in particular any 'history of groundings, collisions, or *damage to the marine environment*'.[155] The categories of ships to which it would apply, as well as the impact on navigation and shipping that the system would have, should also be stated in this summary. The need for routeing measures should be based on traffic considerations as well as marine environmental considerations. In relation to the latter the proposal should state 'whether the proposed routeing system can reasonably be expected to significantly prevent or reduce the risk of pollution or other damage to the marine environment of the area concerned'.

The procedure for designation of ships' routeing measures seems to be based on the application of the precautionary principle, in a way similar to the adoption of PSSAs. Indeed, the first requirement can be likened to the establishment of the value that the particular area represents for the coastal State making the application to the IMO for SRMs. States must consider the risks posed by international shipping to the marine environment in order to establish the need for routeing measures. The environmental sensitivity of sea areas must be considered and its vulnerability to maritime traffic assessed. In other words, States willing to establish SRMs in designated marine areas must carry out a risk assessment of the impact of shipping. They must then show that the proposed measures can prevent or reduce risks of damage to the marine environment of the sea area where they are to be established. This procedure involves an assessment of risks and the adoption of measures to reduce the risk of occurrence of the damage.

5.2.2.4 Precautionary Ships' Routeing Measures

According to the IMO Guidelines[156] there are ten types of routeing measures:

1 Traffic Separation Scheme: a routeing measure aimed at the separation of opposing streams of traffic by appropriate means and by the establishment of traffic lanes.
2 Traffic Lane: an area within defined limits in which one-way traffic is established. Natural obstacles, including those forming separation zones, may constitute a boundary.
3 Separation Zone or Line: a zone or line separating traffic lanes in which ships are proceeding in opposite or nearly opposite directions; or separating traffic lanes from the adjacent sea area; or separating traffic

155 Ibid., para. 3.1, p. 2 (emphasis added). The Legal Committee of the IMO also noted: 'Originally adopted with the view to ensuring the safety of navigation, the measures envisaged in the GPSR [General Provisions on Ships' Routeing] have been adopted by IMO over the years for environmental protection purposes.' *Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organization*, above, note 12, p. 60.

156 Above, note 154.

lanes designated for particular classes of ship proceeding in the same direction.

4 Roundabout: a separation point or circular separation zone and a circular traffic lane within defined limits.
5 Inshore Traffic Zone: a designated area between the landward boundary of a traffic separation scheme and the adjacent coast.
6 Recommended Route: a route of undefined width, for the convenience of ships in transit, which is often marked by centreline buoys.
7 Deep-Water Route: a route within defined limits which has been accurately surveyed for clearance of sea bottom and submerged articles.
8 Precautionary Area: an area within defined limits where ships must navigate with particular caution and within which the direction of flow of traffic may be recommended.
9 Area To Be Avoided: an area within defined limits, in which navigation is either particularly hazardous or exceptionally important, and which should be avoided by all ships, or by certain classes of ships, to avoid casualties.
10 No-Anchoring Area.

Such measures restrict by their nature the freedom of innocent passage of ships in the territorial waters. Even if the right of coastal States to adopt ships' routeing measures can be exercised unilaterally, and is well embedded in international customary law of the sea, it must be exercised with prudence. Their legitimacy could indeed be challenged if other States consider them to unlawfully impinge on their freedom of navigation.

For ships' routeing measures to be lawfully adopted it is therefore important to prove scientifically that they are needed. This would mean that it must be shown that the area where the routeing measures are proposed to be established needs to be protected from risks posed by international shipping. As an example it is interesting to look at a circular adopted in May 2002 by the MSC in relation to various types of routeing measures, other than traffic separation schemes, in various locations around the United States and Colombia.[157] The measures adopted by the MSC are No-Anchoring Areas, Areas To Be Avoided (ATBA), a Two-Way Route and a Precautionary Area. The wording of the circular shows that such measures were adopted on grounds of environmental protection. The provisions relating to the No-Anchoring Area in the northernmost and in the southernmost areas of the Tortugas Ecological Reserve state: 'To avoid destruction of this unique, fragile and pristine coral reef ecosystem from anchoring, all ships shall avoid the area bounded by a line connecting the following geographical positions which is designated as a mandatory no anchoring area.' Similar terms are used to adopt a No-Anchoring

157 *Routeing Measures Other Than Traffic Separation Schemes*, SN/Circ.220, 27 May 2002, Ref. T2/2.07, available on the IMO website at: www.imo.org

Area outside the Tortugas Ecological Reserve, but in this case the measure is applicable only to ships of 50 metres or more. Sections of the circular dealing with ATBA are also based on environmental considerations. An ATBA was adopted near the Florida Keys 'in order to avoid risk of pollution and damage to the environment of these sensitive areas'. The measure applies to ships carrying oil and hazardous materials and all other ships of 50 metres or more. An Area To Be Avoided was also designated around the Malpelo Island, off the west coast of Colombia, 'with a view to avoiding the risk of serious damage to important systems, to the environment, and to the economy of the area'. The same MSC circular modified the parameters of an ATBA off the coast of the state of Washington in the United States, 'in order to reduce the risk of a marine casualty and resulting pollution and damage to the environment of the Olympic Coast National Marine Sanctuary'. Similarly an ATBA was amended around the Shetland Islands 'to avoid the risk of pollution and severe damage to the environment and economy of Shetland'. The identification of a Precautionary Area near the Grand Banks of Nova Scotia follows similar guidelines: 'In order to reduce the risk of a marine casualty and resulting pollution and damage to the environment, all ships involved in the oil related activities being conducted within the area, should *navigate with particular caution* in the area . . .'[158] Ships may still navigate in the Precautionary Area; however, they are continually monitored by the shore station and it is also recommended that ships should contact the shore station and follow its instructions.

The series of measures thus adopted by the Maritime Safety Committee of the IMO is clearly based on environmental considerations. Furthermore it is arguable that such measures are precautionary in essence, because they are intended to prevent the occurrence of damage to the marine environment where there is such a risk. The risk is assessed with reference to the value that States place on their marine environment. The risk of occurrence or the extent of the damage is not scientifically proven but it is likely that without precautionary measures such as routeing measures international shipping could harm the marine environment.

A risk posed by international shipping, whether to the safety of navigation or to the environment, or both, can be dealt with by different routeing measures. The measures may be adapted to suit the particular level of risk. For instance, in 1999 the MSC abolished an Area To Be Avoided around the Alphard Banks (South Africa) because other, more appropriate, measures had been applied. The ATBA had been so identified because there were not enough aids to navigation. However, a Traffic Separation Scheme (TSS) was adopted, which, in the opinion of the MSC, together with the use of GPS, provides a sufficient level of aid to mariners in the area and 'serves the same

158 Emphasis added.

purpose as the original Area To Be Avoided'.[159] This would tend to show that where routeing measures are sought in order to reduce a risk posed by navigation, it is also sought to avoid as much as possible the disruption of international shipping by adopting adequate measures. In the Alphard Banks it is more convenient to use a GPS and follow a TSS than avoid an entire area, and the same result is achieved, i.e. the reduction of probability of occurrence of shipping accidents. In the context of the law of the sea, SRMs significantly soften the freedom of navigation. Legal safeguards are in place to prevent their unchecked multiplication, but their underlying reason for existence is the value choice made by States, both coastal and maritime, to protect the value of the marine environment from certain risks posed by international shipping.

5.2.3 Pilotage

A good example of how this can be done is the establishment of recommended pilotage in the Great Barrier Reef and Torres Strait.[160] In 1991 the Great Barrier Reef Region was identified by the IMO as a PSSA, and recommended pilotage was introduced.[161] It was then extended to the Torres Strait in 2005.[162] The Great Barrier Reef region is known to be highly environmentally sensitive and ecologically important. Animal and plant life is extremely diversified, and includes rare and endangered species. It is also an important shipping area, notably through the Inner Route, running from the Torres Strait to the Capricorn Channel. Typically there are about 2,000 ships at any given time in the Reef, transporting various types of cargo, such as bauxite, coal, crude oil and fuel oil. A study conducted in 1991 by the Australian Bureau of Transport and Communications Economics indicated that the rate of shipping accidents was high in the Torres Strait, Inner Route and North West Shelf. The introduction of recommended pilotage, a form of routeing measure, through the designation of an area as a PSSA shows that routeing measures are now associated with environmental protection, and not just safety of navigation. Proving scientifically that compulsory pilotage was necessary was done on environmental grounds, as required by the PSSA designation procedure. This condition could be interpreted as being a precautionary measure. Indeed, shipping activities in the Great Barrier Reef Region were shown to pose risks to the marine environment. The actual occurrence of harm caused by shipping cannot be ascertained, but the risks of harm were

159 *Routeing Measures Other than Traffic Separation Schemes*, SN/Circ. 203, 8 January 1999, Ref. T2/2.07.

160 *Designation of the Torres Strait as an Extension of the Great Barrier Reef Particularly Sensitive Sea Area*, MEPC 133(53), 22 July 2005.

161 *Protection of the Great Barrier Reef Region*, MEPC 45(30), 16 November 1990.

162 MEPC 133(53), above, note 160.

assessed and are considered as significant. Therefore, adopting measures such as recommended pilotage or routeing measures is precautionary in essence.[163]

5.2.4 Vessel Traffic Services

5.2.4.1 Purpose and meaning of VTS

Vessel Traffic Services (VTS) 'contribute to safety of life at sea, safety and efficiency of navigation and protection of the marine environment . . . from possible adverse effects of maritime traffic'.[164] Pursuant to Regulation 12 of Chapter V of the SOLAS Convention, VTS may be established 'where . . . the volume of traffic or the degree of risk justifies such services'.[165]

There are three types of VTS: Information Service; Navigational Assistance; and Traffic Organisation Services. VTS as an information service is defined as 'broadcasting information at fixed times and intervals or when deemed necessary by the VTS or at the request of a vessel'.[166] Typical information is broadcast on the position, identity and intentions of other traffic, waterway conditions, weather, navigational hazards, and any other factor that may influence passage of vessels.

Navigational Assistance Service is defined as 'a service to assist on-board navigational decision-making and to monitor its effects, especially in difficult navigational or meteorological circumstances or in case of defect or deficiencies'.[167] The IMO Resolution indicates that the provision of this type of service should only occur when it is deemed necessary, in clearly defined circumstances, and the beginning and end of navigational assistance should be stated and acknowledged by both the VTS operator and the other party.[168]

The third type of VTS is a Traffic Organisation Service, defined by the IMO as 'a service to prevent the development of dangerous maritime traffic situations and to provide for the safe and efficient movement of vessel traffic within the VTS Area'.[169] It involves the monitoring of vessel traffic movements and enforces adherence to rules and regulations. Such a service can be put in place for the forward planning of vessel movements, congestion and dangerous situations, the movement of special transports, traffic clearance systems, VTS sailing plans, routes to be followed and adherence to governing rules and regulations.

163 Australia and Papua New Guinea had actually applied to the MEPC for the adoption of compulsory pilotage measures, and not merely recommended pilotage. This application was turned down as it was thought to be too disruptive of the freedom of innocent passage and transit passage. See above in Chapter 2.
164 SOLAS Convention, above, note 30, Regulation 12(1) of Chapter V.
165 Ibid., Regulation 12(2) of Chapter V.
166 IMO Assembly Resolution A.857(20), *Guidelines for Vessel Traffic Services*, para. 1.1.9.2.
167 Ibid., para. 1.1.9.3.
168 Ibid., para. 1.1.9.4.
169 Ibid., para. 1.1.9.5.

5.2.4.2 Guidelines on VTS

The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) has issued a number of recommendations and guidelines for operating procedures applicable to VTS.[170] The standards and criteria adopted by the IALA are well received by individual States, even though they are not binding instruments of international law.

In the 'Guidelines on VTS Operating Procedures' adopted by IALA in June 2000,[171] VTS operating procedures are divided into 'External' and 'Internal' procedures, and are further subdivided into 'Routine' and 'Emergency' procedures. The IALA recognises that specific procedures cannot be developed that would apply to all types of VTS adopted and implemented by individual States. Therefore, VTS authorities are to develop specific procedures, adapted to the particular needs of the area monitored, but based on the general IALA Guidelines. The External Procedures can be either Routine or Emergency procedures. The External Routine procedures cover interactions with users and allied services. They depend on vessels' positions. The IALA places the emphasis on communication with the vessels and with other VTS authorities. The External Emergency procedures are applicable in cases of collisions, groundings, blockage of fairway, pollution, medical or fire actions, search and rescue, natural disasters, piracy and ship stability problems. Re-routeing of vessels is an option when addressing such an emergency.

Shortly after issuing the Guidelines, the IALA published a 'Recommendation on the Implementation of Vessel Traffic Services'.[172] The Recommendation reiterates that the ultimate aim of a VTS system is: 'to improve maritime safety and efficiency of navigation, safety of life at sea and the protection of the marine environment and/or adjacent shore area, worksites and offshore installations from possible adverse effects of marine traffic in a given area'.[173] The IALA considers that a formal approach should be adopted in order to reach these goals. In this respect, risk assessment and safety management needs to be formally addressed in order to ensure the establishment of an efficient VTS system.[174] Such an approach can be classified as precautionary. Indeed, VTS to a certain extent constitute interference by coastal authorities with international shipping, albeit without removing freedom of navigation, on the basis of the assessment of risks to life and the marine environment.

170 The IALA website is at: http://www.iala-aism.org/

171 Available on the IALA website at: http://www.iala-aism.org/

172 IALA Recommendation V-119 of September 2000, available on the IALA website, above, note 170.

173 Ibid., para. 1.1.

174 IALA, *Guidelines on Risk Management*, December 2000 (available on the IALA website, above, note 170), divides the risk management process into five clearly identifiable steps: Risk Identification; Risk Assessment; Risk Control Options; Decision Making; and Take Action. It recommends that a feasibility study should be carried out in five phases, each addressing the Risk Management Process steps.

Coastal States, through the operation of VTS, can monitor the evolution of risk to their interests and take appropriate measures if necessary.

5.2.5 Surveillance technologies: LRIT and AIS

5.2.5.1 Long-range identification and tracking

The Maritime Safety Committee (MSC) of the IMO and its subcommittee on Radio Communications and Search and Rescue (COMSAR) were commissioned to examine the issue of long-range identification and tracking (LRIT) at the 2002 SOLAS Conference. The Conference perceived LRIT as a tool to enhance maritime security and, accordingly, requested the MSC to take action enabling the SOLAS contracting parties to implement LRIT, including ensuring that ships flying their flag would be ready to respond automatically to Inmarsat C polling. MSC was also requested to consider related issues, such as the possible misuse of the system and ways of ensuring its integrity.[175]

At its tenth session, COMSAR adopted draft performance standards and functional requirements for long-range identification and tracking (LRIT),[176] which outlined the constituting elements of LRIT and its foreseen operational functionalities. The final details and required amendments to SOLAS were adopted at the 81st session of the MSC on 18 May 2006.[177] Accordingly, LRIT is described as providing 'for the global identification and tracking of ships'.[178] As such the system has the capacity to identify and track ships at all times in all sea zones, including zones beyond the jurisdiction of States. In summary, LRIT services are furnished by providers which must be approved by the IMO. They collect information from ships, which is then stored and managed in one or more Data Centres, also recognised and approved by the IMO. This information concerns the identity, position and time and date of position of ships, and is transmitted automatically from a system fitted on ships. Flag States can obtain information regarding ships flying their flag directly from the LRIT coordinator.[179] Other States which are contracting governments may also obtain information from the LRIT coordinator about ships either bound for their port, or which are navigating within 1,000 nautical miles of their coasts.[180] However, flag States have the prerogative to not

175 Source: IMO website, 'Long range identification and tracking (LRIT)', available at: www.imo.org/Legal/mainframe.asp?topic_id=905

176 COMSAR 10/16, Annex 17, 27 March 2006.

177 *Amendments to the Protocol of 1988 relating to the International Convention for the Safety of Life at Sea*, 1974, MSC.204(81), 18 May 2006, which amended Regulation 19-1 of Chapter V of SOLAS.

178 COMSAR 10/16, above, note 176, para. 1.1.

179 MSC.204(81), Regulation 19-1, para. 8.1.1.

180 Ibid., para. 8.1.2 and 8.1.3.

provide LRIT information to other contracting governments. The LRIT system should comply with the applicable law on the protection of maritime information and, in particular, in relation to commercial confidentiality.[181]

LRIT is perceived as a tool for environmental protection, maritime safety and security, and not solely for security as it originally emerged.[182]

From the point of view of coastal States, LRIT could constitute a useful potential tool to combat marine pollution from ships, protect life at sea and detect terrorist threats. Technically the system is not restricted to geographical areas, and is capable of providing information about all ships anywhere they are. LRIT therefore complements AIS. The IMO has further developed criteria and standards for the establishment of an International LRIT Data Exchange,[183] its operation[184] and performance standards.[185]

5.2.5.2 Automatic Identification System

Automatic Identification System (AIS) was phased in as a compulsory piece of communication equipment for most ships engaged on international voyages. Thus the IMO amended Chapter V of SOLAS, to insert AIS carriage requirements to Regulation 19. According to this provision, 'AIS shall:

- provide automatically to appropriately equipped shore stations, other ships and aircraft information, including the ship's identity, type, position, course, speed, navigational status and other safety-related information;
- receive automatically such information from similarly fitted ships;
- monitor and track ships; and
- exchange data with shore-based facilities.[186]

The IALA summarises the purposes of AIS as follows:

- to identify vessels;
- to assist target tracking;
- to simplify information exchange; and
- to provide additional information to assist collision avoidance.[187]

181 Ibid., para. 10.2.
182 See for instance www.imo.org/Legal/mainframe.asp?topic_id=905
183 *Establishment of the International LRIT Data Exchange*, MSC.297(87), 21 May 2010.
184 *Operation of the International LRIT Data Exchange*, MSC.322(89), 20 May 2011.
185 *Adoption of Amendments to the Revised Performance Standards and Functional Requirements for the Long-Range Identification and Tracking of Ships*, MSC.330(94), amending MSC.263(84), 25 May 2012.
186 International Convention for the Safety of Life at Sea (SOLAS), Chapter V, Safety of Navigation, Regulation 19, Carriage requirements for shipborne navigational systems and equipment, section 2.4, MSC.73/21/Add.2, Annex 7, pp. 137–8.
187 IALA Guidelines on AIS as a VTS Tool, December 2001, available on the IALA website, above, note 170.

AIS is therefore a tool for the improvement of aid to navigation, as it is capable of broadcasting information about the movements of ships at high frequency (up to 2,000 time slots per minute with updates every two seconds) to coastal authorities. It can provide a high level of assistance to vessel traffic services authorities if associated with a radar or Electronic Chart Display and Information System (ECDIS) facility. The IMO has in fact clearly identified this function of AIS, in the IMO Performance Standards for AIS, by stating that 'AIS should improve the safety of navigation by assisting in the efficient navigation of ships, protection of the environment, and operation of Vessel Traffic Services (VTS).'[188] There is, however, another function of AIS, also acknowledged by the IMO and IALA, which is the tracking of ships. In the same document on Performance Standards for AIS, the IMO states: 'AIS should be capable of providing to ships and to competent authorities, information from the ship, automatically and with the required accuracy and frequency, to facilitate accurate tracking.'[189] AIS information can therefore be used by coastal States for 'maritime domain awareness and safety', in particular by:

- monitoring restricted areas;
- monitoring mandatory routes;
- generating alerts in shore-based monitoring centres;
- providing data for Port State Control, port authorities, coastguard centres and other authorities and services; and
- monitoring vessels of particular interest.[190]

The tracking of ships by coastal authorities is made possible by the nature of the information transmitted by AIS. According to the IMO, AIS information includes data relating to the ship (static information), data relating to the ship's course, position, speed (dynamic information) and data relating to the ship's draught, cargo, destination and route plan (voyage-related information).[191] The IALA gives a detailed breakdown of the information that will have to be transmitted by AIS according to international standards.

Static (manual input):

- Maritime Mobile Service Identity (MMSI);
- IMO number;

188 *Recommendation on Performance Standards for a Universal Shipborne Automatic Identification System (AIS)*, MSC.69/22/Add.1, Annex 12, p. 13.

189 Ibid., p. 13.

190 IALA *Guidelines on the Management and Monitoring of AIS Information*, December 2005, available on the IALA website, above, note 170.

191 *Draft Guidelines for the Onboard Operational Use of Shipborne Automatic Identification System (AIS)*, NAV 46. The IMO adopted Resolution A.917(22) on 29 November 2001 on Guidelines for the Onboard Operational Use of Shipborne Automatic Identification System (AIS).

- call sign and name;
- length and beam;
- type of ship; and
- location of position-fixing antennae on the ship (aft of bow and port or starboard of centreline).

Dynamic (automatic input):

- ship's position with accuracy indication and integrity status;
- position time stamp in Coordinated Universal Time (UTC);
- course over ground (COG);
- speed over ground (SOG);
- heading;
- rate of turn;
- optional – angle of heel;
- optional – pitch and roll;
- navigational status;
- provision must be made for inputs from external sensors giving additional information.

Voyage data (at master's discretion or as required by the competent authority):

- ship's draught;
- hazardous cargo (type, as required by a competent authority);
- destination and estimated time of arrival (ETA) (at master's discretion) and waypoints;
- optional – route plan (field not provided in basic message).[192]

This type of information, provided the technology adequately and faithfully transmits it, can allow shore stations to monitor the movements of ships. AIS has improved the vessel tracking capabilities of VTS centres. Indeed, VTS stations are able to receive information on ships within VHF range, and are no longer limited to radar range. Furthermore, the position accuracy of AIS is more precise than radar, allowing a 10-metre precision. 'Radar shadow areas' are avoided to a large extent, and the accuracy of traffic image will be enhanced. AIS transmissions, being based on VHF channels, are not affected by poor weather conditions as much as radar is.[193] The IALA stated that:

> Where a VTS centre is able to receive AIS information from vessels within or adjacent to its area, the quality, accuracy and reliability of vessel tracking will be improved markedly. As a consequence, that VTS

192 IALA Guidelines on AIS as a VTS Tool, above, note 187, pp. 5–6.
193 Ibid., pp. 7–8.

> centre will be able to provide more precise navigational advice, as and when required, or when deemed necessary.[194]

A recognised additional use of AIS is for risk analysis and risk assessment on the basis of historical AIS data. The long-term planning, optimising design and operations of VTS can thereby also be enhanced, thanks to the results of these risk analyses and assessments.[195]

Shore stations, by storing and managing such information received from ships, can therefore build a database concerning ships, and have a better knowledge of the traffic along their coasts. AIS technology constitutes an advance on previous aids to navigation tools by providing information specific to ships. Indeed, it transmits not only the ship's position, but also its course and speed, heading and navigational status. Moreover, it is capable of providing details concerning the identification of the ship (MMSI; IMO number; type of ship; draught; hazardous cargo; and destination and ETA). The Navigation Committee of the IMO has rightly pointed out that AIS would increase accuracy in the transmission of information, as it would 'reduce *verbal* mandatory ship reporting'.[196]

Since the inception of AIS, the International Maritime Organization, the International Association of Lighthouse Authorities, the International Electrotechnical Commission and the International Telecommunication Union have issued documents concerning its technical requirements,[197] technological specifications[198] and operational requirements on board ships and ashore.[199] The AIS technology was phased in from 2002 until 2008 according to Regulation 19 of Chapter V of SOLAS. It is significant that while the technological description of AIS includes ship-to-ship and ship-to-shore communication, SOLAS only imposes obligations on ships to carry AIS. International legal instruments do not include requirements for States to

194 Ibid., p. 7.

195 IALA *Guidelines on the Management and Monitoring of AIS Information*, above, note 190.

196 *Draft Guidelines for the Onboard Operational Use of Shipborne Automatic Identification System (AIS)*, NAV 46, p. 2, emphasis added.

197 *International Convention for the Safety of Life at Sea (SOLAS)*, Chapter V, Safety of Navigation, Regulation 19, Carriage requirements for shipborne navigational systems and equipment, section 2.4, MSC.73/21/Add.2, Annex 7.

198 *IMO Recommendation on Performance Standards for a Universal Shipborne Automatic Identification System (AIS)*, MSC.69/22/Add.1.

199 *IALA Recommendation on the Provision of Shore Based Automatic Identification Systems (AIS)*, IALA Recommendation A-123, December 2002; IALA *Guidelines on the Universal Automatic Identification System (AIS)*, Volume 1, Part I – Operational Issues, Edition 1.1, December 2002; IALA *Guidelines on AIS as a VTS Tool*, December 2001; IMO Assembly resolution A.917(22) on *Guidelines for the On Board Operational Use of Shipborne Automatic Identification Systems (AIS)*; IMO *Guidelines for the Installation of a Shipborne Automatic Identification System (AIS)*.

equip their coastal stations with the equipment capable of receiving AIS information. It seems to be in coastal States' best interests to install this equipment, yet they are not under an obligation to do so. The IALA encourages the installation of AIS shore infrastructures, when stating that 'the provision of shore based AIS will be necessary to attain the full benefit of the 1974 SOLAS Convention'.[200]

The developments at IMO concerning LRIT and AIS are further proof that the balance of powers between coastal and flag States is evolving. Through the negotiating platform that the various IMO committees represent, States are able to reach agreement on important points regarding the need of coastal States to be legally able to better prevent damage to their marine environment. This is achieved under the framework set by UNCLOS, and concerns coastal powers of prevention of harm. It is argued that the precautionary principle is central to this approach. Indeed, it is the willingness to control possible risks of harm to the marine environment from ships that motivates coastal States to claim rights of monitoring foreign vessels navigating along their coasts, with technologies such as AIS and LRIT.

5.3 Conclusion

This technical chapter has shown that the precautionary principle acts in a persuasive way to modify the balance of rights between coastal and flag States, while still operating under the auspices of the UN Convention on the Law of the Sea. The IMO seems to have taken heed of the mandate given to it by Agenda 21 regarding the precautionary principle, and to have implemented it through its various committees (MEPC and MSC principally). What is remarkable is that it appears that, for all these measures of navigation regulation (PSSAs, Ships' Routeing Measures, Pilotage, Vessel Traffic Services), the first step for coastal States is to demonstrate to the IMO that particular sea areas represent a certain value for them, in terms of ecological, social and economic criteria. This is then followed by detailed procedures that must be followed before the measure is approved, and further operational procedures once the measure is in place. This is a purely precautionary framework, in the sense that coastal States must show that the sea areas which they value are threatened by certain risks posed by international shipping. It can further be said that this approach is prudential: coastal States establish criteria that reflect the necessity to take good care of the marine environment against potential damage from international shipping, and they make careful decisions for the good of shipping, of the marine environment, and ultimately for the good of people.

200 IALA Recommendation A-123 on the Provision of Shore Based Automatic Identification Systems (AIS), December 2002, available on the IALA website, above, note 170.

In the context of the main argument of this book, the second noticeable feature common to these navigation measures is that they are debated and accepted by the members of the relevant IMO Committees, and thereby endorsed by both coastal and flag States. This is significant because it shows that there is an agreement between these traditionally opposed sides on the necessity to adopt environmental protection measures against risks of vessel-source pollution. The IMO therefore provides a platform where coastal and flag States can negotiate and reach an agreement on the necessary navigational measures.

As argued above, these measures reflect an application of the precautionary principle, therefore it can be said that they also reflect a consensus on the precautionary principle between coastal and flag States. In the light of the argument developed in Chapters 3 and 4 that the precautionary principle can only attain a legally binding status on a sectoral level, Chapter 5's conclusion is critical. Indeed, it supports the claim that in the defined sector of vessel-source pollution, the precautionary principle may be seen as having attained this status. Because it appears that coastal and flag States agree on the necessity to protect defined parts of the oceans against risks of vessel-source pollution, both sides make a conscious value choice to restrict navigational rights. In other words they apply the precautionary principle, and give it the necessary normative content for a legally binding status. This in turn could be used by coastal States to justify intervention measures towards High Risk Vessels, if and when necessary, and under strictly defined conditions.