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Chapter 13

PARTICULARLY SENSITIVE SEA AREAS: THE NEED FOR REGIONAL COOPERATION IN THE ADRIATIC SEA

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ABSTRACT

The paper discusses the need for the designation by the International Maritime Organization, of the Adriatic Sea as a Particularly Sensitive Sea Area (PSSA). The rationale for this inheres in the special features of the Adriatic Sea area, while the policy context has been set by the trend of European Union countries to advocate the proclamation of PSSA in marine areas surrounding Europe. Firstly, the PSSA concept is briefly reviewed and the current status of designations assessed. Secondly, the emerging policy of the EU towards PSSA proclamations is focused on and pressing reasons such as tanker accidents are highlighted; some background factors, such as the restructuring of oil transportation flows in Eurasia are commented upon. Thirdly, key features of the Adriatic Sea as corresponding to the criteria for the designation of PSSA are explained, including the basic characteristics of the area, status and trends of international navigation here, and present and potential associated protective measures to address the risks. Also, the Croatian initiative towards regional cooperation on an Adriatic PSSA is briefly presented. And finally, some conclusions on prospects for regional cooperation towards a PSSA in the Adriatic Sea are made, considering contrasts and commonality in that area.

Key words:
Particularly Sensitive Sea Area, European Union, Croatia, Adriatic Sea, regional cooperation, International Maritime Organization, marine environmental protection, international shipping

INTRODUCTION

In recent years, the EU has expressed its strong commitment to the prevention of environmental catastrophes resulting from shipping accidents along, in particular, the Atlantic coast of Europe, in the Baltic Sea, and in the Mediterranean Sea. As one of the key means to this effect, the identification of Particularly Sensitive Sea Areas has been argued for by the EU countries within the International Maritime Organization (IMO).

The PSSA concept was not widely used as an instrument of marine environmental protection until recent years. This trend, as far as seas off the European coasts are concerned, was partially prompted by the Prestige disaster.[i] A broader reason is the on-going changes in oil transport through Eurasia, and the resultant increased intensity of oil tanker traffic on the existing routes, as well as the introduction of new traffic directions in the seas surrounding Europe. This trend will continue, primarily as a result of several current and planned oil pipeline integration and construction projects in the region.

While the proposals of the European countries for a PSSA in the Atlantic waters off their coasts, as well as in the Baltic Sea, have recently been adopted by the IMO, this has not been the case with the remaining sea singled out, the Mediterranean Sea. Given the heterogeneity of the Mediterranean situation, a joint proposal of all those states for the entire Mediterranean does not look like a realistic option.

Within the Mediterranean Sea, however, there are several sea areas which may benefit from a PSSA status, and where a joint proposal of the states concerned may significantly enhance management of the risk posed by international shipping. The Adriatic Sea is a clear and pressing example. Recently, Croatia expressed its interest in playing a key role in a joint regional proposal for a PSSA in the Adriatic Sea.

This paper discusses the need for the designation by the IMO of the Adriatic Sea as a PSSA. The rationale for this inheres in the special features of the Adriatic Sea area, while the policy context was set by the trend of the EU countries to advocate the proclamation of PSSAs in marine areas surrounding Europe, as well as by other broad proces-

ses such as the evolving EU Marine Strategy. These considerations of the trends in the IMO and EU, as reflected in the special situation of the Adriatic Sea, have determined the structure of the paper. Firstly, the PSSA concept is briefly reviewed, and the current status of IMO designations assessed. Secondly, comments on the emerging policy of the EU towards PSSA proclamations are provided; apparent reasons such as tanker accidents are highlighted, while some background factors, such as the restructuring of oil transportation flows in Eurasia, are commented upon. Thirdly, key features of the Adriatic Sea as corresponding to the IMO criteria for the designation of PSSA are explained: (i) basic characteristics of the area; (ii) status and trends of international navigation here; and (iii) present and potential associated protective measures to address the risks. Following from this, the recent Croatian initiative for regional cooperation on an Adriatic PSSA is briefly presented. And finally, some conclusions on prospects for regional cooperation towards a PSSA in the Adriatic Sea are made, considering contrasts and commonality in that area; but also comments on the Adriatic Sea as a region in the context of the EU Marine Strategy, and on the need for the establishment of all-Adriatic cooperation on marine environmental protection are added. An Adriatic PSSA would be an important first step in that direction. Institutionalization of all-Adriatic regional cooperation, perhaps through a body such as an Adriatic commission for marine environmental protection, involving all six Adriatic states – Albania, Bosnia and Herzegovina, Croatia, Italy, Montenegro and Slovenia – could be the next step worth considering.

WHAT IS A PARTICULARLY SENSITIVE SEA AREA?

The Particularly Sensitive Sea Area concept in a nutshell

A PSSA is a marine area that needs special protection through action by the IMO because of its significance for recognized ecological or socio-economic or scientific reasons, and because it may be vulnerable to damage by international shipping activities.

Designation of a PSSA through the IMO is currently based on the revised Guidelines adopted by the IMO Assembly in December 2005.[ii] The Guidelines define three sets of criteria:

- *ecological* criteria, such as the naturalness, integrity or fragility of an ecosystem,
- *social, economic and cultural* criteria, including significance of a sea area for tourism, fishing and other socio-economic dependency, as well as the cultural heritage, and
- *scientific and educational* criteria, meaning that the sea area has high importance for research and exceptional educational possibilities.

Not all of the criteria listed in the Guidelines need to be satisfied in every particular case; it suffices that some, and at least one, of the criteria are met throughout the area. In conjunction with that, however, it is crucial that the area is at risk, whether actual or foreseeable, of damage from *international shipping* activities (not other maritime activities alone). Related to the risk so posed, associated protective measures within the competence of the IMO should be available.

Thus, identification of any PSSA requires consideration of three integral components: (i) the particular conditions of the sea area to be identified; (ii) the vulnerability of that area to damage by international shipping activities; and (iii) the availability of associated protective measures within the competence of the IMO to address risks from these shipping activities.

When an area is approved by the IMO as a PSSA, and so designated, specific measures can be used, subject to approval by the IMO, to reduce the risk created by the shipping activities in that area. Those measures can comprise ships' routeing such as traffic separation schemes and areas to be avoided, mandatory vessel reporting systems, application of discharge restrictions, prohibited activities or compulsory pilotage schemes. While many of those measures can be adopted through separate procedures, and based on IMO conventions such as MARPOL, SOLAS and some others, an IMO-designated PSSA provides today a well-established political and legal framework within which measures for a certain sea area can be adopted in a more systematic but also innovative manner.[iii] This aspect can be especially important in seas surrounded by several coastal states, such as enclosed or semi-enclosed seas, where states need to be more oriented towards regional cooperation.

In addition, the designation of a sea area as a PSSA highlights the need for special caution to be exercised here by shipping activity, and thus contributes to an enhancement of the awareness of the sensitivity of the area. The intention is not to restrict shipping activity, rather to ensure adequate risk management regulation in areas where in-

ternational shipping poses a particular threat. The IMO Guidelines aim at a thorough consideration – based on relevant scientific, technical, economic and environmental information – of all interests involved regarding the sea area concerned: those of the coastal state, flag state, as well as the environmental and shipping communities.

Particularly Sensitive Sea Areas to date: the European Union taking over

Ten sea areas have been designated by the IMO as PSSAs:

- the Great Barrier Reef (proposed by Australia, adopted by the IMO in 1990; and extended in 2005, on a proposal by Australia jointly with Papua New Guinea, to include Torres Strait),
- the Sabana-Camagüey Archipelago (Cuba, 1997),
- Malpelo Island (Columbia, 2002),
- the marine area around the Florida Keys (United States, 2002),
- the Wadden Sea (jointly proposed by Denmark, Germany and the Netherlands and adopted by IMO in 2002),
- Paracas National Reserve (Peru, 2003),
- the Western European Atlantic waters (Belgium, France, Ireland, Portugal, Spain and the United Kingdom; 2004),
- the Baltic Sea area, except Russian waters (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden; 2005),
- the Galapagos archipelago (Ecuador, 2005), and
- the waters of the Canary Isles archipelago (Spain, 2005).

As can be seen at the first glance, most of the PSSAs were proposed and adopted only in the past few years; and out of the total of six marine areas adopted as PSSA in the past four years (from October 2002 to October 2006), four were proposed by EU countries. Even more striking, among the total of 22 countries to have submitted proposals to the IMO, most – 15 altogether – were EU countries, acting either individually or, more often, jointly. Several of the PSSAs were adopted to protect an archipelago, islands or a reef. What can not be seen from the list is that the PSSA concept – initially seldom used and, perhaps more important to note, rather politically neutral – has in the past few years become heavily politicized.[iv]

THE EUROPEAN UNION AND PARTICULARLY SENSITIVE SEA AREAS: RESPONSES TO CHANGING CIRCUMSTANCES

Responses to marine pollution incidents

Prompted by a row of major tanker accidents off European coasts in the 1990s, the EU adopted several regulatory packages, known as "Erika" (after the name of the last ship in the 1990s accidents line).[v] The catastrophe of the single-hull, 26 year old tanker Prestige off the Atlantic coast of Spain in November 2002, however, had a triggering effect for a major EU "offensive" also on the global, IMO level.[vi] One key string of that was the request to the IMO for accelerated phasing-out of single-hull tankers carrying heavy-grade oil.[vii] The other was an EU countries campaign aimed at IMO proclamation of several European sea areas as PSSAs. The two were not unrelated, as soon confirmed by the measures proposed within the application for the Western European Atlantic PSSA (discussed below).

In addition, as of July 2003 the EU strengthened regulations to accelerate various restrictions on single-hull tankers using ports of the EU countries – starting with heavy-grade oil prohibition (a type that, incidentally, amounts to only a fraction of the oil imported into EU ports).[viii]

During its EU presidency, Ireland announced its strong commitment to securing greater protection against environmental catastrophes resulting from shipping accidents in the Baltic Sea, waters off the Atlantic coast of Europe, and in the Mediterranean Sea.[ix] The proposals for PSSA designation of the first two sea areas mentioned were soon made, and eventually adopted at the IMO. However, for the third sea singled out, the Mediterranean as a whole, no PSSA proposal has ever been made, nor does it look very likely to follow. The Mediterranean, bordered by over twenty coastal states, is characterized by both political heterogeneity and division into several more compact ecological sub-regions. As a whole – and even under the unlikely hypothesis that its numerous and divided group of coastal states agreed on a joint PSSA proposal – the Mediterranean would hardly satisfy the criteria set by the IMO for a PSSA. Quite to the contrary, however, certain parts of the Mediterranean can be seen as clear PSSA candidates.

European proposals in the International Maritime Organization

Following the *Prestige* disaster, by the end of 2002 and in early 2003 a plethora of EU bodies considered the PSSA a policy option to be used at the international level. Formally, however, the proposals can only be attributed to the states concerned.

In April 2003, six EU countries submitted to the IMO a joint proposal for the designation of a PSSA in a vast marine area called "West European Atlantic Waters".[x] Measures proposed related to single-hull tankers carrying heavy-grade oil, and included the requirement on restrictions of transit through the area (withdrawn after various interventions from other states, including Japan), and a reporting obligation within a 48-hour notice period. The latter measure persisted, though doubts have been expressed whether a PSSA was actually needed for that purpose. Some commentators have coined this PSSA a "politically sensitive sea area".[xi]

Soon after, in December 2003, the Baltic states, excluding Russia, proposed to the IMO the designation of the Baltic Sea – excluding Russian waters – as a PSSA.[xii] There was no new measure appended to that proposal, though. At the same time, the discussion over accelerated phasing out of single-hull tankers returned to other IMO agenda (MARPOL amendments), while talks with Russia on that matter regarding the practice in the Baltic have been entered into.

Formally, neither the West Atlantic nor the Baltic PSSA proposal is an "EU proposal". In the real world, while supporting both proposals, the EU acted in the IMO as a voting block and, together with other votes attracted, gained a majority in favor for both proposals. The West Atlantic PSSA was adopted at the IMO in 2004, and the Baltic Sea PSSA in 2005.

Both proposals, and especially the Baltic, attracted strong criticism from Russia, as well as from several countries where a high tonnage of the world fleet is registered, such as Panama and Liberia. In addition, stakeholders such as shipping industry associations (INTERTANKO and others) added their voices. While Russia, seconded by "flags of convenience" states and shipping industry associations, was the main opponent of the European proposals for PSSA proclamations in the Atlantic waters and the Baltic Sea, in the latter case, as of 2005, it was joined by firm support given in the IMO deliberations by states such as China and India.

The wider context: oil pipelines in Eurasia and maritime transport

There is also a wider context for the marine environmental protection initiatives advocated by the EU in the recent years. The key reason behind them is conveniently summarized in the 2003 Energy Policy Communication from the European Commission, stating:

"The accidents of the Erika and the Prestige, and the significant environmental damage caused by the resulting oil spills, has *highlighted* the necessity for concerted action between the European Union and neighbouring countries to ensure the highest possible safety standards for the maritime transportation of oil. Given the increasing density of the maritime traffic in the waters around the EU, it is of utmost importance to give a higher priority to considering, where economically and technically feasible, the alternative of transporting oil by pipelines. This is considerably safer and more environmentally friendly. A number of pipelines already link the European Union with Russia and it is important to ensure that not only are these fully utilised, but also that new pipeline infrastructure are considered *instead* of new maritime-based projects" [emphasis added].[xiii]

These considerations, while highlighting environmental concerns, are also of a strategic nature, and are related to energy security. The Eurasian space has witnessed major changes since the dissolution of the Soviet Union, which led to the creation of a number of independent states in the oil-rich Caspian region. And in the late 1990s, Russia itself re-emerged as the second (after Saudi Arabia) most important global oil exporter, due to increased production and stagnating domestic consumption. Change in the infrastructure for oil transport from producers to consumers, however, has not followed the speed of these geopolitical changes; that infrastructure is still to a large extent based on organizations and relationships of the Soviet era. That system, through the interconnection of oil pipelines and tankers, is currently able to transport Russian crude (Urals) through the Transneft network leading in three main directions.[xiv] One is to Central Europe via the Druzhba system (facing serious bottlenecks); the other leads overseas through the Baltic Sea ports (none of which is a deep-sea port accommodating Very Large Crude Carriers);[xv] and the third, also overseas, is through the Black Sea ports, limited already due to the Bosporus Strait "absor-

ption capacity". Moreover, Caspian region states' oil exports will be adding to the load on the already heavily congested Bosporus.

For the EU, and especially the large industrial countries of continental Europe, the prime concern in oil import is not the increased volume (such as for e.g. China), but rather the *diversification* of sources of import. While the annual increase in oil consumption in those countries is relatively small, and far below major overseas consumer markets, the US and big Asian countries, the key concern for continental European countries is their proportionally high dependence on Russian and OPEC oil imports. The increased import of Caspian region oil, however, can in future be facilitated by the integration and completion of regional pipeline networks, thus directly connecting Black Sea ports (such as Constanta in Romania, or Odessa in Ukraine) to the European mainland, avoiding transit through the Bosporus; but also competing with Russian oil in the Baltic and Black Seas.

If one were to summarize this broad trend by selected keywords, those include "diversification", "pipelines" (land routes) and "Caspian oil". There is, of course, much fine-tuning to be performed. On this type of oil issue, the EU is far from being a compact unit; there are many differences between the individual countries, the key one being in the entirely different situation between the big countries of continental and island Europe. Moreover, there are differences in the relations of certain large European countries with Russia. Along with that, the issue of investments needed for new major projects is always present.

The Mediterranean: a sea where one quarter of world oil is transported

Focusing on the Mediterranean, there is one striking feature of the maritime uses of that enclosed basin, connected to the rest of the ocean space only by the narrow straits of Gibraltar and the Bosporus, and the Suez Canal. An estimated 30 percent of international sea-borne trade, including around one-fourth of global oil maritime transport, transits the Mediterranean Sea, the surface of which represents less than 1 percent of the world marine area!

While a large volume of oil is transported here, a major share is however in transit for destinations beyond the Mediterranean: to continental Europe, northern European ports, as well as overseas. In additi-

on to OPEC oil from the Middle East and North African ports, around one third of annual Russian oil exports (around 62 million tons) is loaded on tankers in the Black Sea ports and transits the Bosporus Strait every year. With high traffic congestion, as well as measures introduced by the Turkish authorities, the Bosporus Strait is one of the serious bottlenecks for global oil transport; the waiting time for tankers in winter to transit the Strait can be several weeks, resulting in huge costs for delays. Moreover, the Black Sea will increasingly face additional pressure, as the Caspian region oil exports grow.

Oil pipelines and projects directly related to Croatia or the Adriatic Sea

Political chart of the Adriatic Sea: coastal states and main ports

Due to this situation, but also due to geostrategic considerations, a number of "Bosporus bypass" projects, i.e. oil pipeline projects to connect Black Sea ports directly with the Mediterranean, or mainland Europe, have been initiated. The interests and visions of the key state players in those – the United States, EU countries, and Russia – interact in many, sometimes conflicting ways; and are also inevitably intertwined with the priorities and interests of big investors, producers, transporters and markets. Projects thus emerge without mutual coordination, and often compete or collide. The first such Bosporus bypass project, after a multi-billion investment and strong US political backing, was completed in 2005 and officially opened in July 2006: the large capacity Baku-Tbilisi-Ceyhan (BTC) oil pipeline. The BTC may over

time contribute to a substantial increase in the volume of oil transported by tankers through the Mediterranean.

One of the important oil transport routes in the Mediterranean leads through the Adriatic Sea, all the way to the north Adriatic ports (Trieste, Venice, Omišalj and Koper). Around 57-58 million tons of oil are transported yearly on that exclusively *import* route, and a major share of that (currently around 37 million tons yearly) is further imported through the Trans-Alpine pipeline into Central Europe. There are, however, several projects and plans (some of which are in collision) on how to introduce *export* directions from the deep-sea Adriatic ports. One such project, the Albania-Macedonia-Bulgaria oil pipeline (AMBO), would connect the Bulgarian Black Sea port of Burgas with the Albanian Adriatic port of Vlorë, and enable overseas export of primarily Caspian oil. Another project, known as Druzhba-Adria, aims at integrating the southern Druzhba and the Adriatic pipeline, adjusting the flow direction in the latter, with the purpose of enabling Russian (Urals) crude export through the Croatian port of Omišalj. At times, there were also considerations for a third possible line – the connection of the Ukrainian Black Sea port of Odessa, via Brody, to Omišalj, for the purpose of Caspian oil export – yet that one would compete with Druzhba-Adria on a part of the same, capacity-deficient line on the southern Druzhba. The priorities of countries such as the US and Russia collided on those lines.

And finally, there is a project known as Pan European oil pipeline (PEOP). This is a major undertaking, planned in the next decade to connect directly the Romanian port of Constanta at the Black Sea, through Serbia, Croatia, and (possibly) Slovenia, all the way to Trieste in Italy, to be here integrated with the Trans-Alpine pipeline, thus securing to Italy and Central European countries a direct, land route access to the Caspian oil traded in the Black Sea.

While facing these and several other projects, the Mediterranean is a region characterized by heterogeneous features, both in natural and political sense. A PSSA proposal for the entire Mediterranean is not a likely option, and it may be difficult to see what would be the practical effect of it. For several parts of the Mediterranean, however, a PSSA can be a feasible and useful measure.

THE ADRIATIC SEA AS A PARTICULARLY SENSITIVE SEA AREA?

The Adriatic Sea: basic notes

The Adriatic Sea is a narrow, shallow and temperate warm semi-enclosed sea, forming a distinct sub-region within the Mediterranean Sea region. The sea is nowadays bordered by six countries: Albania, Bosnia and Herzegovina, Croatia, Italy, Montenegro and Slovenia.

With its only entrance through the Strait of Otranto, the Adriatic Sea appears as an indented gulf, deeply incised into the European mainland. Due to this strategic position, the Adriatic Sea has been a trade and transport route since antiquity; and there is no need for a "crystal ball" to predict that this function will persist in future, though with patterns adjusted to the era.

While it is clear that the southern border of the Adriatic Sea is in the Strait of Otranto area, there are some differences as to where exactly to set the line between the Adriatic and Ionian Seas. According to the limits proposed in 1953 by the International Hydrographic Organization, this border follows the line running from the mouth of Buttrinto River (latitude 39º44' N) in Albania and on to Cape Santa Maria di Leuca in Italy (39º45' N).[xvi] For the practical purposes of determining the area for the Adriatic Sea PSSA, however, a slightly more narrow delimitation is relevant: also situated in the Strait of Otranto, but at latitude 40º25' N. The entire sea area north from that line corresponds to the area of application of the existing IMO-associated protective measures, including the mandatory ship reporting system (see further below).

One might indeed enter into discussion on how to understand the politically relevant framework for "regional" cooperation on marine environmental protection in the Adriatic Sea. Is it the broader Adriatic-Ionian initiative, as developed over the past few years? Or a more narrow, trilateral cooperation between Croatia, Italy and Slovenia in the North Adriatic? In the context of international cooperation on marine environmental protection, "region" is, of course, a functional category.[xvii] Neither of those mentioned, however, respond to the purpose at hand – the regional protection of the Adriatic Sea, due to its special attributes, as a PSSA.

The understanding of the region that fully corresponds to that particular need is, however, found in the newly proposed European Commission Directive establishing the EU Marine Strategy.[xviii] The

Strategy divides European marine waters into three main regions, the Mediterranean Sea being one of those; and further divides regions into sub-regions, to account for the peculiarities of particular areas. The Mediterranean is thus sub-divided into four areas, the Adriatic Sea being a clearly distinct sub-region, bordered by two EU countries: Italy and Slovenia (Article 3). Member states within each marine region or sub-region are required to make every effort to coordinate their actions with third countries (Article 5); in the Adriatic Sea, this includes Croatia, as a candidate for EU membership, and Albania, Bosnia and Herzegovina, and Montenegro. For marine environmental protection through mechanisms such as PSSA, the EU Marine Strategy thus confirms the Adriatic Sea as a whole as a policy-relevant framework.

The Adriatic Sea and criteria for a Particularly Sensitive Sea Area

The main features of the Adriatic Sea not only set it aside as an integrated marine unit, but also largely correspond to the three sets of criteria for PSSA designation, as detailed by the IMO Guidelines: ecological, socio-economic and scientific criteria.

The Adriatic Sea area is a unique and sensitive marine ecosystem, and an outstanding example of a semi-enclosed sea.[xix] Its environmental conditions are extraordinary, predominantly caused by a specific system of exchange of waters with the Ionian Sea, the thresholds of Otranto separating the Adriatic Sea from the Ionian Sea, and of Palagruža separating the deeper south Adriatic from the shallower north Adriatic. Moreover, freshwater input from the mountain regions of the Adriatic eastern coast and north Italian rivers substantially contribute to the uniqueness and rarity of a variety of specific ecosystems.

Along the eastern Adriatic coast there are over 1,200 islands, islets and rocks. This large archipelago is unique in the Mediterranean Sea by reason of its geographical and geomorphologic karstic structure, and still retains a well preserved ecosystem. The western Adriatic coast represents the largest sandy and muddy coastal habitat in the whole northern Mediterranean area.

Adriatic ichthyofauna is highly diversified, with numerous species but low abundance. With regard to its uniqueness and richness in biodiversity and living communities, this region represents an outstanding value not only in European, but in global proportions too.

The large-scale human-induced threats to the special attributes of this area come from land-based sources (especially in the north Adriatic, though locally also in other zones at the coast with the increase of human population), from demersal (benthic) over-fishing, and from possible impacts of shipping. There is, though, one distinction worth noting. Along most of the eastern Adriatic coast, and especially offshore islands of the middle and south Adriatic, even a moderate stress resulting from international shipping activity (both oil spill and ballast water impacts) could be devastating to the fragile environment, which has at many places still maintained a high degree of naturalness. Further stress in the north Adriatic and along part of the western coast, where eutrophication is of particular concern, would contribute to the deterioration of its present status.

Regarding the social, cultural and economic attributes of the area, the environmental quality and the use of living marine resources are of particular socio-economic importance, especially for tourism, recreation, and fisheries. There is, in addition, a high degree of human dependency on the sea and coastal area, particularly on many Adriatic islands. Finally, the cultural heritage of this area is of particular importance due to the presence of significant historical and archaeological sites. Since ancient times, the Adriatic Sea has been an important transportation route; hundreds of ancient ship wrecks recorded in the Adriatic Sea and numerous other remains bear witness to an exceptional archaeological value.

The Adriatic Sea and international navigation: status and trends

International shipping activity in the Adriatic Sea is becoming increasingly dense. This is due to the location of important industrial centres, especially along the western Adriatic coast, but also due to ports serving for transit to other countries in Central Europe, such as particularly in the north of the Adriatic coast (the ports of Trieste, Venice, Koper, Rijeka basin). Moreover, new transit ports are expected to gain significance in the south of the eastern Adriatic coast, such as Ploče in Croatia, Bar in Montenegro, and Vlorë in Albania from where a major new transportation route for Caspian oil export may be expected.[xx] Trends in the development of international shipping activities will lead to an increased density of traffic (also due to projects such as

"Motorways on the Sea"), with special emphasis on several parts of the Adriatic Sea, as well as partly to the change in the nature of traffic. A significant increase in the volume of transport of oil and other harmful substances, including liquefied natural gas (LNG), can be expected.

Key features of hazardous cargo shipping in the Adriatic Sea

A spill could have disastrous effects on the vulnerable nature and natural resources of the Adriatic Sea, as well as on its important uses such as for tourism and local fisheries. In this respect, the introduction of invasive alien species via ballast water and hull-fouling is also a great concern. Let us therefore take a closer look at some key features of the current and projected shipping activity in the Adriatic, and possible impacts.

The vast majority of ships carrying potentially harmful substances are found in three categories: oil tankers, chemical tankers, and gas carriers, including LNG and liquefied petroleum gas. Currently, there is no LNG tanker traffic in the Adriatic Sea, while various other types of substances are carried by tankers. When summing up those three vessel types, around 4,500 to 5,000 estimated port calls by ships carrying harmful substances as cargo are performed each year in the Adriatic Sea navigation.

It is especially oil transportation that, in the last decade, is increasing in the Adriatic Sea. Currently, the most important direction for oil transport in the Adriatic Sea is the *import* route, arriving through the Strait of Otranto and transiting the entire sea to the north Adriatic oil terminals: Trieste (importing annually around 38 million tons), Venice (slightly under 11 million tons), Omišalj (around 7 million tons) and Koper (around 2 million tons). There are also several other important Italian oil ports in the Adriatic Sea (especially Ancona and Ravenna), as well as various coastal routes, mainly for product oil, summing up the current annual volume of oil (crude and product) transported in the Adriatic Sea in the range of 70 million tons. In the next five to seven years, changes are expected in the Adriatic oil transport, related to three main parameters: (i) the introduction of one entirely *new route* for oil transportation in the Adriatic Sea; (ii) the introduction of *export* directions to be added to the currently almost exclusive import directions; and

(iii) *volume* of oil transported, which is likely to increase significantly, possibly even by around 50%.

Transport, i.e. import of LNG, while not present for the time being, can be expected to become a significant element in the Adriatic international ship transport by the end of this decade/beginning of the next. That is primarily due to several Adriatic LNG import terminals under construction, such as the import terminal Brindisi (earliest finalization planned for 2008) and the offshore import terminal Isola di Porto Levante off Venice (also earliest planned for 2008). In addition, there is a recent revival of plans for the construction of a larger LNG import terminal on the eastern Adriatic coast, also for gas import to several Central European countries; as well as plans for an offshore import LNG terminal in the Bay of Trieste, while an on-shore LNG terminal there is under consideration as well.

Accident exposure in the Adriatic maritime traffic

Maritime traffic in the Adriatic Sea (largely including international shipping activity) is characterized by the interaction of four main patterns. First, the traffic along the Adriatic Sea, between the Strait of Otranto in the south and north to the Bay of Trieste, in which many large commercial vessels are involved. Second, the crossing traffic between the ports on the western and eastern Adriatic Sea coasts. Third, the traffic between the ports along the same coast of the Adriatic Sea, which in case of the western coast is domestic (Italian) traffic only, while along the eastern Adriatic coast can involve ports in several states (Slovenia, Croatia, Italy, Montenegro, Albania). And fourth, various "irregular" navigation forms, involving large cruise vessels, numerous yachts, fishing vessels, as well as various other small boats.[xxi]

The shape of the Adriatic Sea (long and rather narrow), together with demographic characteristics (large commercial ports in the northernmost part of the Sea), makes the traffic patterns, which interact in several ways within the Adriatic Sea, complex and challenging to control. A relatively high number of large oil tankers travel up to the north Adriatic ports loaded with crude or product oil. These oil tankers are exposed to dense crossing traffic (especially Italy-Croatia/Croatia-Italy) along the journey. What in particular makes this risk high is the rather long distance of approximately 420 nautical miles from the Strait of

Otranto to the busy north Adriatic import ports. The long distance implies a long travel in a dense traffic area.

A brief assessment of the overall accident exposure in the Adriatic Sea has recently been undertaken by Det norske Veritas (DNV).[xxii] By comparing the accident rate in the Adriatic Sea to other areas around the world, the conclusion reached was that the Adriatic Sea belongs to the highest accident frequency category. According to that study, the Adriatic Sea has an accident frequency more than five times as high as the world average. The accident occurrence as related to the commercial traffic load was evaluated to be higher for the Adriatic Sea than for other highly dense shipping areas like the Mexican Gulf and the Barents Sea.

Regarding the number of ship accidents in the Adriatic Sea over the past 15-years period, a total of 174 accidents have occurred.[xxiii] However, actual pollution caused by accidents so far has not been as serious as the frequency of accidents could suggest.[xxiv] There have been no incidents causing a major spill in the Adriatic Sea, and a relatively small number of accidents actually caused any significant pollution. Nonetheless, several cases where consequences could have been grave can be pointed to. In 1984, the chemical tanker *Brigitta Montanari* sank near the Kornati National Park. Another serious accident occurred in 1974 in the Strait of Otranto, when the dry cargo carrier *Cavtat*, after colliding with a bulk carrier, sank to the depth of almost 100 meters. *Cavtat* carried some 150 tons of tetramethyl lead and 120 tons of tetraethyl lead; substances potentially hazardous for human health. In cases like these, the environmental consequences might have been disastrous.

Beyond accidents: operational pollution by vessels and environmental impact

While larger ship accidents are rare and regularly attract media attention, the major share of vessel-source marine pollution on a cumulative basis is, however, not to be attributed to accidents, but primarily to regular, routine daily ship operations, resulting in chronic pollution.[xxv] This may be especially serious in enclosed and semi-enclosed seas.

As to vessel-source pollution of the sea by oil, operational discharges emanating from large ships are – while illegal – frequent in many parts of the Mediterranean, including the Adriatic Sea.[xxvi] The continuo-

us analysis of images obtained through special satellite technology and performed in the past several years has demonstrated that enhanced spill concentrations appear along major maritime routes, including the one crossing the Ionian Sea and leading through the Adriatic Sea.[xxvii] Here, however, spills occur in a shallow and narrow semi-enclosed sea with a sensitive marine environment. The first, overall Mediterranean reconnaissance study estimated the cumulative annual size of the area of oil spills in the Adriatic Sea to be around 1,228 square km (which is approximately three times the size of the largest Adriatic island, Cres).[xxviii] A specific study made for the Adriatic Sea (including the entire sea area north of latitude 39° N) detected 257 oil spills from ships in 1999; 263 spills in 2000; 184 in 2001; and 244 spills in 2002.[xxix] These studies provide the first accurate statistical maps of oil discharges in the Adriatic Sea. The studies also prove that this activity is on-going on a large scale here, despite the Special Area status for the entire Mediterranean Sea under MARPOL Annex I, prohibiting the discharge of oil and oily waste.

A matter of increasingly serious concern in the Adriatic Sea is the introduction of harmful aquatic organisms and pathogens through ships' ballast water and sediments. The quantity of ballast water released in the Adriatic ports of Italy, Croatia and Slovenia estimated for the year 2003 was around 8 million tons, of which around 80% was discharged in Italian Adriatic ports, while the remaining volume was shared between the Slovenian port of Koper and all the Croatian ports together. However, most of that ballast water arrives from locations within the Mediterranean (58%), and due to inter-Adriatic traffic (34%), while only 8% of ballast water volume released in the Adriatic ports is currently originating from ports located outside the Mediterranean Sea.[xxx] With expected changes in import and export flows, and especially if a major new oil export route is introduced from a deep-sea port in the Adriatic, those proportions would change considerably, so that a far larger ballast water volume discharged in the Adriatic Sea would be from vessels arriving from ports outside the Adriatic and Mediterranean Seas. Risk of introduction of harmful aquatic organisms and pathogens could in that case become significantly increased.

International Maritime Organization and protection measures for the Adriatic Sea

The third element of the PSSA concept, building on the previous two – the identified attributes of the sea area, and vulnerability of these to impacts of international shipping – consists of measures within the competence of the IMO. These, under the terminology of the IMO Guidelines "Associated Protective Measures", should be specifically tailored to address risks from the shipping activities in the area. Some of the measures may already be existing and applied in the area, while others can be proposed in the application for the PSSA. Some previous PSSAs were approved by the IMO on the basis of existing Associated Protective Measures only. Though still possible on paper, after the recent revision of the IMO Guidelines (and indeed their expected implementation in the IMO practice), this will in most cases no longer suffice for a convincing argument on the need for the PSSA. In the case of the Adriatic Sea, both the already existing and possible newly proposed Associated Protective Measures can be considered in the PSSA context.

Existing associated protective measures in the Adriatic Sea

There are several sets of Associated Protective Measures adopted so far under the ambit of the IMO, either specifically for, or applicable to the Adriatic Sea. These include: (i) mandatory ship reporting system; (ii) routeing systems; and (iii) Special Area status under the Annexes to MARPOL. The first two sets of measures were adopted by the IMO in recent years, upon joint proposals submitted by several Adriatic Sea countries.[xxxi]

The *mandatory ship reporting system* in the Adriatic Sea (ADRIREP) was adopted by the IMO in December 2002, with entry into force on 1 July 2003. As of that date, all oil tankers of 150 gross tonnage and above, and all ships of 300 gross tonnage and above, carrying dangerous or polluting goods as cargo, need to report to the designated Adriatic coastal authorities their entry into the Adriatic Sea (at the latitude 40º 25' N), their position at several check-points (sectors), and their departure from the Adriatic. The primary objective of the system is to support safe navigation and protection of the marine environment through the exchange of information.

Moreover, there are several *routeing measures* in implementation in the Adriatic Sea as of 1 December 2004. This routeing system consists of traffic separation schemes in the North Adriatic Sea, as well as in the Gulf of Trieste, Gulf of Venice, for approaches to/from Koper and Monfalcone. Also, there are two precautionary areas (in the North Adriatic and in the Gulf of Trieste), and an area to be avoided in the North Adriatic. In addition to those mandatory measures, there are recommended directions of traffic flow in the Strait of Otranto, South and Middle Adriatic Sea.

Finally, the entire Mediterranean Sea area, the Adriatic Sea included, was declared a *Special Area* under MARPOL, Annexes I and V, in order to protect these sensitive sea areas against the discharge of oil or oily mixtures, and garbage.[xxxii] Subject to the provisions of Annex I, i.a. any discharge into the sea of oil or oily mixtures from any oil tanker, and any other ship of 400 gross tonnage and above, is prohibited in the special area. As discussed above, recent evidence indicates that this prohibition is frequently violated by ships involved in international traffic in the Adriatic Sea.

Possible proposed associated protective measures for the Adriatic Sea

A PSSA application, in proposing new measures, should *identify the legal basis* for each measure. In the case of the Adriatic Sea, two types of situations can emerge in this respect.

Firstly, measures with a legal basis already available under an existing IMO instrument in force can be proposed. These are primarily routeing measures, since the current routeing system in the Adriatic Sea would evidently need to be strengthened, at least in three segments in the Middle and South Adriatic: around the islands of Palagruža, Jabuka, and in the Strait of Otranto. Also, part of the existing routeing measures in the North Adriatic will need some adjustment due to the planned expansion of gas exploitation activities from the Adriatic continental shelf. For this type of measures to be proposed to, and adopted by, the IMO, no PSSA is essentially needed – though such measures would indeed strengthen the application for a PSSA. Equally so, they can be adopted through a special procedure at competent IMO bodies, and referred to in the PSSA application.

Secondly, some other measures possibly to be proposed for the Adriatic Sea in the PSSA context, do have – under the terms of the IMO Guidelines – the "legal basis available" in an IMO instrument, albeit that instrument is not yet in force. The case in point is the Ballast Water Convention,[xxxiii] and the "additional" or "more stringent" measures as envisaged in this Convention. If a proposal for certain measures in that category proves to be successful, that would be, in terms of Associated Protective Measures, the real and significant practical effect of establishing the PSSA in the Adriatic Sea.

A key consideration of whether such measures may be proposed is of a legal nature; and it is a matter of policy whether the proposed measures will thereupon be adopted at IMO. As to the legal conditions: according to the IMO Guidelines, any proposed Associated Protective Measures must have a legal basis. That condition is, by the letter of Guidelines, satisfied by the *adoption* of an IMO convention or other legal instrument.[xxxiv] The Ballast Water Convention was adopted at the IMO in February 2004. The Convention is, however, not yet in force, and will not, due to rather stringent requirements, enter into force for some years to come. The requirement for this is the ratification (or equivalent) of 30 states, the combined merchant fleet of which constitutes not less than 35% of the gross tonnage of the world's merchant shipping.[xxxv] By way of illustration: to date, over two years after the Convention was adopted, only six states have ratified it, representing altogether – a mere 0.6% of world tonnage.[xxxvi]

The objective of that Convention is to ultimately eliminate the transfer of harmful aquatic organisms via ships' ballast water and sediments. This goal is to be met through gradual introduction of technology for on-board ballast water *treatment*. Ballast water *exchange*, as currently used, is accepted as an interim measure only. However, until entirely phased out – and, under the Convention, that must happen by the year 2016 – there are still ten years to go for seas such as semi-enclosed Adriatic, where ballast water exchange poses very difficult and specific questions, often different from areas facing the open ocean.

According to the Convention, ballast water exchange must be conducted, whenever possible, at least 200 nautical miles from the nearest land and in water at least 200 meters in depth. Yet, in cases where the ship is unable to conduct ballast water exchange in a location so determined, exchange must be done as far from the nearest land as possible, and in all cases at least 50 nautical miles from the nearest land and in water at least 200 meters in depth. Considering the complex proce-

dure for ballast water exchange, there are no areas in the Adriatic Sea that can satisfy those conditions.

These provisions are of particular importance for shallow and narrow sea-areas, where ship-lanes are relatively close to the shores. European waters as a whole are largely characterised by the latter; and the Adriatic Sea is a prominent example. Where a particular sea or sea-area does not satisfy such basic requirements, coastal or port states can consider invoking procedures for additional, more stringent measures.[xxxvii]

For the Adriatic Sea, two different Associated Protective Measures related to ballast water may optimally be considered within the proposal to the IMO for a PSSA designation. First, designation of the Adriatic Sea as a No-Ballast-Water-Exchange Area for ballast water arriving in the Adriatic in ships from other seas. And second, mandatory ship reporting on ballast water entering the Adriatic Sea. Both measures should apply in the *entire* Adriatic Sea; and both should be considered as temporary – through 2016, or any later time, depending on whether the Ballast Water Convention enters into force, and indeed on-board treatment becomes globally applied by the shipping industry.

Croatian initiative for regional cooperation for the Adriatic Sea

The idea of proclaiming the Adriatic Sea a PSSA is not entirely new; it was first mentioned in expert literature,[xxxviii] advocated by environmental NGOs, recently also by some politicians and media alike, and eventually stated in several regional policy documents. Notably, within the framework of the Mediterranean Action Plan, a sub-regional contingency plan for major marine pollution incidents in the Adriatic Sea was adopted by Croatia, Italy and Slovenia in November 2005. In that contingency plan, the three countries envisaged to "collaborate in designating PSSAs in the area covered by the Plan" and jointly propose these to the IMO, along with Associated Protective Measures.[xxxix]

Indeed, in addition to adopting specific protective measures, designation of a PSSA in the Adriatic Sea can provide a significant regional cooperative framework, in line with the EU policy, and also highlight the awareness of the vulnerability of the Adriatic Sea environment. It can moreover have an echo in domestic political scenes, due to increased public awareness of the need for marine environmental pro-

tection. There are therefore many valid reasons for pointing out the desirability of a PSSA status for the Adriatic Sea.

There was, however, one "missing link" between the *ideas* given on PSSA, and a concrete *proposal* for a PSSA elaborated. The IMO Guidelines prescribe strict requirements on how a PSSA proposal should be structured and what elements it needs to contain. Extensive, multidisciplinary expertise and access to data on virtually all aspects of the marine area (natural, navigational, socio-economic, legal) need to be employed in the forming of the PSSA proposal, and presented as information in a policy-relevant manner.

Croatia has, in addition to favoring the idea on the PSSA in the Adriatic Sea, recently undertaken also that preparatory part of the job missing so far on the Adriatic scale. In spring 2004, the Fridtjof Nansen Institute proposed the initiation of a cooperative project within the framework of the bilateral development assistance programme between Norway and Croatia, which would result in an expert study on the Adriatic Sea as PSSA. The project proposal was supported by the Croatian Ministry of the Sea, Tourism, Transport and Development, and a cooperative group involving the Institute of Oceanography and Fisheries in Split and Dubrovnik, the Croatian Hydrographic Institute, the Ruđer Bošković Institute in Zagreb, Det norske Veritas, and the Fridtjof Nansen Institute as project coordinator, was assembled in autumn 2004. The actual work on drafting the expert study proposal for the Adriatic PSSA started in April 2005, and was completed in March 2006, when the draft study was, through the Croatian Ministry of the Sea, distributed to the competent authorities of all the other Adriatic countries: Albania, Bosnia and Herzegovina, Italy, (the then) Serbia and Montenegro and Slovenia. At the same time, the Croatian Ministry of the Sea initiated the forming of a Joint Expert Group of the Adriatic countries on PSSA.

With the participation from all the six Adriatic states, and under Croatian chairmanship, the Joint Expert Group on PSSA met in Opatija, Croatia, on 20 April 2006, and discussed the text which resulted from the study made in the above-mentioned project.[xl] In Conclusions adopted at the meeting, the Joint Expert Group established a Correspondence Group, under the joint chairmanship of all the Adriatic countries, and with the technical support of the Croatian Maritime Authority.[xli] A timetable for the finalization of a joint proposal on Adriatic PSSA by end-2006 has been agreed upon, with the view of proposal submission to the IMO. It was agreed that the Joint Expert Group wo-

uld have its final meeting in January 2007, immediately followed by a ministerial conference of the Adriatic states, to be hosted by the Government of Croatia. If successful, this would then enable the joint Adriatic PSSA proposal to be submitted to the IMO.

ADRIATIC CONTRASTS AND COMMONALITY: PROSPECTS FOR REGIONAL COOPERATION

Beyond the requirements to satisfy formal criteria contained in the IMO Guidelines and provide an expert basis for this, a PSSA proposal in the semi-enclosed Adriatic Sea with several littoral states is a more complex affair, if compared to those PSSAs proposed by a single country only. As an instrument of *regional* Adriatic cooperation on marine environmental protection from impacts caused by international shipping, a PSSA initiative here needs successfully to pass two key steps, and not only one. First, such an initiative, where two or more countries have a common interest in a particular area, should be formulated in coordination. An outcome based on consensus of the Adriatic States is an optimal, though not strictly legally required avenue, as evident in recent IMO practice.[xlii]

And second, such a regional cooperation towards PSSA, to have a real bearing on international navigation – which is an inherently global activity – needs to be approved at the global, IMO level. At that level, the Adriatic states can indeed, for all the reasons explained above, be in a position to make a strong case for a PSSA to be designated in the Adriatic Sea.

But will they cooperate regionally towards a joint proposal; and if so, why? A glance at the Adriatic Sea shows that the situation here is rather specific. The Adriatic Sea is a semi-enclosed sea, formed as a deeply indented gulf. Total length of the Adriatic Sea coastline (mainland and islands) extends over some 8,300 km. However, more than half of this length is due to the numerous islands forming an archipelago along part of the eastern Adriatic coast, in particular along the coast of Croatia, extending its coastline to well over 6,200 km, which is around 75% of the entire Adriatic coastline. For Croatia, this lengthy coast with its preserved marine environment is an important resource in itself, and a key generator of its economic development, especially due to growing tourism. Italy's Adriatic coastline, situated along the entire western coast, is significantly less indented, with a total length of close to

1,300 km (or around 15% of the Adriatic coastline). The remaining part of the entire Adriatic coastline extends along the opposite, eastern side and is shared between three countries, all still with a distant possibility of an EU membership: Albania, around 400 km of coastline; Montenegro, 290 km; and Bosnia and Herzegovina, 21 km. The only other EU member state on the Adriatic Sea coast, Slovenia, has 45 km of coastline, thus adding up the remaining 0.5% of the total length of the Adriatic coastline.

When it comes to maritime traffic and trade volume, however, the situation in many respects may look reversed, especially as to the proportions attributed to the eastern and western Adriatic coasts. By far the largest share of the maritime traffic and trade relates to Italian ports, which annually receive around 75% of the total commercial ship traffic and 80% of the total cargo transported. Croatia currently makes up around 10% of the total Adriatic traffic, both in terms of number of vessels and amount of cargo; though with an obvious tendency of growth. The remaining countries – Slovenia, Bosnia and Herzegovina (through the Croatian port of Ploče), Montenegro and Albania – all together make up the remaining 15% of the traffic and 10% of the cargo. Among their ports, however, the single Slovenian international commercial port of Koper is distinguished as the most important one, with an annual throughput (in 2005) of around 2,000 vessels and over 13 million tons cargo, thus larger than any other single port on the eastern Adriatic coast (excluding the Italian port of Trieste).

The significance of this difference from the perspective of marine environmental protection and resource management can be illustrated in the context of ballast water issues. Already if looking only at the three Adriatic countries – two EU members (Italy and Slovenia) and one candidate (Croatia) – they all show profoundly different circumstances. Italy is, due to maritime export, the biggest generator of ballast water introduction into the Adriatic Sea ports, accounting for over three quarters of the annual total. Slovenia's coastline is indeed a short one, yet this country is not a negligible contributor of ballast water in the Adriatic Sea, due to the maritime export volume from its single international port, Koper. Finally, Croatia has by far the longest coastline in the Adriatic Sea, yet it is currently contributing less ballast water import, due to its relatively low (yet increasing) volume of maritime export.

At the same time, however, Italy is by far the biggest Adriatic fishing nation, with its marine capture fisheries exceeding that of Croatia's

fleet by some eight to ten times, and that of Slovenia by around 100 times. Harmful effects of invasive alien species introduction through ships' ballast water (and other vectors) may result in devastating effects to fisheries, which is an important consideration for Italy. For Croatia, fisheries as well as aquaculture are significant not only in economic potential but also in employment, and thus demographic, terms – with a large number of Croatia's islands deteriorating in both population age and number. The social implications of fisheries, including even maritime country profile, are important considerations in some other Adriatic countries. Likewise, tourism, with all its economic, cultural, social and other effects, is an important consideration shared by the Adriatic countries, though to varying extents.

The shared feature of those different country cases is, however, the Adriatic Sea itself – a relatively narrow and shallow, semi-enclosed sea, deeply incised into the European mainland. This situation has, through history and in future projections alike, led to the Adriatic Sea serving as a traditional maritime transport and trade route – where, however, possible impacts by the growing international shipping in one area may easily be reflected in any other area, thus potentially in the entire region. All the Adriatic countries indeed share one important, lasting feature: they are all coastal states here, with a multitude of important activities, international shipping by both coastal and other countries being only one among these.

The Adriatic Sea is thus a region that inevitably needs to be oriented towards cooperation in approaching issues of joint concern, including marine environmental protection – yet where all the participants retain certain profoundly different features as their dominant. In that situation, to strike the right balance between the national regulation sphere, which can take into account each country's peculiarities, on the one hand, and regional cooperation based on commonality, on the other, will likely remain the key challenge for the Adriatic countries. However, in relation to third parties, i.e. to non-Adriatic flag states, a joint platform with uniform requirements will be preferable.

This is why the PSSA option as a concept balancing the apparently local and regional environmental protection interests, on the one hand, with the interests of international shipping and industry, on the other – also beyond the formal requirements of satisfying the given IMO criteria – may prove to be a feasible and useful avenue for the Adriatic Sea.

When seen in relation to the recently emerging context of regionalisation of the "European Seas", which is an obvious trend and an important underlying element for the development of the newly proposed EU Marine Strategy Directive, the relevance of an Adriatic Sea PSSA is further enhanced. The EU Marine Strategy aims at the creation of marine regions and sub-regions as policy-relevant clusters – with the Adriatic Sea identified as one of several clearly designated sub-regions within the wider, less compact Mediterranean region. While the Strategy is directly applicable only to the EU member states and marine waters covered by their sovereignty or jurisdiction, member states are required within each marine region or sub-region to make every effort to coordinate their actions with third countries. An ability to cooperate on a PSSA may prove a key test-case for the Adriatic countries – EU members, candidates, or aspirants alike – towards a meaningful implementation of an otherwise broad EU Marine Strategy, on a specific and needed goal of Adriatic marine environment protection and sustainable development. An Adriatic PSSA would be an important first step in that direction. Institutionalization of all-Adriatic regional cooperation, perhaps through a body such as an Adriatic commission for marine environmental protection, involving all six Adriatic states – Albania, Bosnia and Herzegovina, Croatia, Italy, Montenegro and Slovenia – could be the next step worth considering.

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i *The disaster of the oil tanker Prestige began in a storm off the Spanish coast of Galicia on 13 November 2002; six days later, the tanker broke in two. Oil spilled*

thereafter into the sea amounted to 64,000 tons, resulting – in addition to pollution of the sea – in the pollution of several thousands kilometres of the coast and in huge material damage. For the initial EU reaction see: Commission of the European Communities (2002).

ii *These revised Guidelines replaced the "Guidelines for the Designation of Special Areas under MARPOL 73/78 and Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas", Resolution A.927(22), of 29 November 2001. The new "Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Area" was adopted by the IMO Assembly Resolution A.982(24) on 1 December 2005.*

iii *MARPOL is the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto; for the Convention with Annexes, including unified interpretations and amendments, see: MARPOL 73/78 (2002). SOLAS is the International Convention for the Safety of Life at Sea, 1974; for the Convention, with its Protocol of 1988, annexes and amendments, see: SOLAS (2004).*

iv *On the origins of the PSSA concept and considerations related to early proclamations, see: Gjerde and Freestone (1994).*

v *The major oil tanker accidents of the 1990s included those of Aegean Sea in 1992, Braer in 1993, Sea Empress in 1996, and Erika in 1999. All of these resulted in huge costs for clean-up operations, and to fisheries and tourism and other losses.*

vi *See a review by Frank (2005).*

vii *MARPOL defines types of tankers and types of oils in detail. Heavy-grade oil, if spilled into the sea, may cause a particularly serious marine pollution event.*

viii *See: Regulation (EC) No 1726/2003 of the European Parliament and of the Council, of 22 July 2003, amending Regulation (EC) No 417/2002 on the accelerated phasing-in of double-hull or equivalent design requirements for single-hull oil tankers. For an interesting commentary, see Boyle (2006).*

ix *See a review by Tracey (2004).*

x *See the document: Designation of a Western European Particularly Sensitive Sea Area (2003).*

xi *Roberts [et al.], 2005. For yet another approach see Detjen (2006).*

xii *See document: Designation of the Baltic Sea as a Particularly Sensitive Sea Area (2003).*

xiii *See: Commission of the European Communities (2003:26-27), para. 7.4.*

xiv *The Urals grade is a blend of light sweet crude oil from the oil fields in Western Siberia ("Siberian Light") and heavy sour crude oil from the fields in the Ural and Volga regions. Urals emerged in the international oil market in the 1970s, and is still used in the Transneft's oil pipeline network.*

xv *Very Large Crude Carrier (VLCC) is a tanker with a capacity to carry 200,000-320,000 tons of oil as cargo; and thus more commercially attractive for long, overseas journeys.*

xvi *See: IHO (1953:17). As stated in the Preface to that edition: "These limits have no political significance whatsoever".*

xvii *For a discussion on how to understand "region" and "regional" in the context of marine environmental protection, see Boyle (2000).*

xviii *See: Commission of the European Communities (2005).*

xix *Notes on the key natural features of the Adriatic Sea, as summarized in this section, draw on the material prepared for the project "Expert study on a Particularly Sensitive Sea Area for the Adriatic Sea" by Ivona Marasović, Adam Benović and*

Nedo Vrgoč of the Institute of Oceanography and Fisheries in Split and Dubrovnik, as well as by Nenad Leder of the Hydrographic Institute of the Republic of Croatia.

xx *Recent developments introduced a measure of uncertainty on the prospects for Vlorë becoming a major oil export port, since the Albanian government – under public pressure due to environmental concerns, but also due to geopolitical considerations – informed that the terminal for the AMBO project would not be in Vlorë, but in the region of Porto Romano (Durres); see Bulgarian Standart and Macedonian Utrinski Vesnik of 7 October 2006.*

xxi *For instance, visits of large cruiser ships to Croatian ports in 2003 increased by around 190%; from 307 in 2002 to 582 ships in 2003. Most of those, i.e. 575, were concentrated in the larger Dubrovnik area. In the tourist season, the area around Dubrovnik is often daily visited by up to 10 such large cruisers.*

xxii *Source: Summary of findings by DNV as presented in "Designation of the Adriatic Sea as a Particularly Sensitive Sea Area – First draft prepared for the Meeting of the Joint Expert Group on PSSA, 20 April 2006", internal document, on file with the author.*

xxiii *See: Lloyd's Register Fairplay accident database, 1990-2004.*

xxiv *See: IMO/UNEP (2004). In REMPEC data-base, "oil" is recorded for the period August 1977 to December 2003 (List A); and "HNS" for the period January 1988 to December 2003 (List B).*

xxv *See, e.g. REMPEC (2004:13-18) and European Commission/Joint Research Centre (2002).*

xxvi *For an excellent recent study on the subject of vessel-source pollution, see Khee-Jin Tan (2006).*

xxvii *The analysis consisted of images from satellites equipped with Synthetic Aperture Radar (SAR), as performed from 1999 on by the Sensors, Radar Technologies and Cybersecurity (SERAC) Unit of the Institute for the Protection and Security of the Citizen at the European Commission DG Joint Research Centre (JRC) at Ispra in Italy.*

xxviii *See: European Commission/Joint Research Centre (2001:10).*

xxix *See: European Commission/Joint Research Centre (2005:10).*

xxx *Based on the findings in the project "Ballast Water Issues for Croatia", implemented by DNV and the Fridtjof Nansen Institute, 2004-2005.*

xxxi *See the document: Establishment… (2003).*

xxxii *MARPOL Annex I (Regulations for the Prevention of Pollution by Oil; Regulation 10) and Annex V (Regulations for the Prevention of Pollution by Garbage; Regulation 5).*

xxxiii *The International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004. The Ballast Water Convention was adopted at the IMO on 16 February 2004.*

xxxiv *See para. 7.5.2(3) of the IMO Guidelines. In particular, para. 7.5.2(3.ii) of the Guidelines is unambiguous on that requirement, and its interpretation is a rather straightforward matter. That is further confirmed by the statement that:"This option obviously makes the legal basis very clear; the basis would have to be in an IMO-adopted instrument"; in: Identification and Protection… (2005:5).*

xxxv *Article 18(1) of the Ballast Water Convention.*

xxxvi *See: "Summary of Conventions as at 30 April 2006", at IMO web-site: www.imo.org. Contracting states so far are: Maldives, Nigeria, Saint Kitts and Nevis, Spain, Syria and Tuvalu.*

xxxvii Ballast Water Convention, Regulation C-1 (Additional Measures), in conjunction with Article 2(3) of the Convention (More stringent measures).

xxxviii See, e.g. Zec and Komadina (1996).

xxxix The Plan was adopted by the Agreement between Croatia, Italy and Slovenia, in Portorož, November 2005. On PSSA, see especially para. 2.5.2 of the Plan.

xl The study is contained in the document: "Designation of the Adriatic Sea as a Particularly Sensitive Sea Area – First draft prepared for the Meeting of the Joint Expert Group on PSSA, 20 April 2006", internal document, on file with the author.

xli In accordance with the document titled: "Adriatic PSSA Joint Expert Group (JEG) – Conclusions of the First Meeting and Plan of Activities", of 20 April 2006, internal document, on file with the author.

xlii PSSA in the Baltic Sea has been approved by the IMO in spite of strong opposition by one of the Baltic states, Russia, whose waters were exempted from the proposed area. The Baltic Sea has indeed experienced a significant growth in the volume of Russian oil export in recent years.

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