

A Global Solution to the Risk of International Shipping in Particularly Sensitive Sea Areas:

A Feasibility Study for the Salish Sea

Prepared by FRIENDS of the San Juans for the
Samish Indian Nation



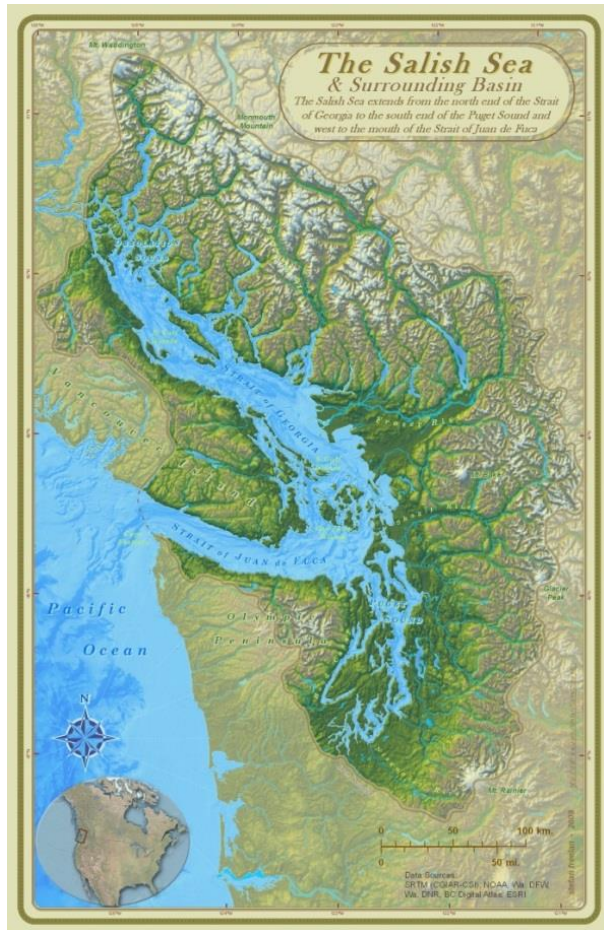
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The Risk

Since the 1960s, the waters of the Salish Sea (and especially the Juan de Fuca Strait and Puget Sound) have not only been exposed to the risk of oil pollution, they have also had to deal with actual oil spills and pollution. Since the 1980s, there have been six significant spills.¹ These larger spills have been in addition to dozens, if not hundreds (depending on how the counting is undertaken), of lesser spills. These lesser spills have still cost hundreds of thousands, if not millions of dollars, once the costs of the cleanup, restoration and fines are totaled.²



In large part, these accidents are due to the heavy shipping traffic in this area. Currently, around 11,000 large vessels and oil barges transit to and from the San Juan Islands Figure 1. This figure includes over 1,322 oil tankers, each of which carries an average of 30 to 40 million gallons of crude oil. Around 4,300 of these large vessels are destined for United States' ports in Puget Sound.

The other 6,250 make for Canadian ports. This level of shipping traffic already comes with a certain inherent level of risk. For example, between 1995 and 2005, there were 1,462 accidents and 1,159 incidents reported.³ Projections for future growth in shipping suggest that the number of total transits, when viewed cumulatively of all the proposed projects currently foreseeable in the region, transiting through the Salish Sea could increase by thousands, - possibly doubling.⁴ This increase in traffic, type, and size correlates with an increased risk of accidents.⁵

¹ Ross, W. (1973). *Oil Pollution as an International Problem: A Study of Puget Sound and the Strait of Georgia*. (University of Victoria Press, Canada). Vagners, J. (1972). *Oil on Troubled Waters* (University of Washington Press, Seattle). The recent examples include the *Arco Anchorage* which, in 1985, spilled 239,000 gallons of crude oil off the Strait of Juan de Fuca.

This incident was followed, in 1988, by the barge *Nestucca* which spilled 231,000 gallons of crude oil in the outer coast near Grays Harbor; in 1991, the cargo ship *Tuo Hai* which collided with the fishing vessel *Tenyo Maru* spilling 400,000 gallons of heavy oil outside the entrance of the Strait of Juan de Fuca; in 1999, the explosion at Olympic Pipeline, killing 3 and spilling 277,000 gallons of gasoline into Whatcom Creek in Bellingham; in 2003, the Foss barge spill at Point Wells spilled approximately 4,700 gallons of heavy fuel during a transfer in Snohomish County; and, in 2004, the Conoco Phillips oil tanker *Polar Texas* spilled 7,200 gallons of ANS Crude oil while the ship attempted to introduce ballast water into its oil tanks. See Department of Ecology/Puget Sound Partnership (2011). *Improving Oil Spill Prevention and Response in Washington State: Lessons Learned From the BP Deepwater Horizon Oil Spill*. (DoE, Publication Number: 11-08-002). 7.

² US Fed New Service (2007). 'Oil Cleanup Continues in Puget Sound'. 28 Feb. DiBenedetto, B. (2006). 'Polar Tankers to pay \$540,000 fine for Puget Sound spill'. Journal of Commerce 16 Oct: 1. Note also, US Fed News Service. (2009). 'Tug Company Fined For Puget Sound Oil Spill'. 19 Nov. Ramasamy, E. (2006). 'ConocoPhillips to Pay \$2.31 Million for Puget Sound Crude Spill'. *Platts Oilgram News*. October 18.

³ Hass, T. (2012). *The Vessel Traffic Risk Assessment for BP Cherry Point and Maritime Risk Management in Puget Sound*. (Puget Sound Partnership). 5. van Dorp, J. (2008). [Assessment of Oil Spill Risk due to Potential Increased Vessel Traffic at Cherry Point, Washington](#).

⁴ Pacific International Terminals, Inc. (2011). *Project Information Document, Gateway Pacific Terminal*, Whatcom County, Washington. 304 p. Also, *Vessel Entries and Transits: 2011 WDOE Publication 12-08-003* April 2012

⁵ Montewka, J. (2012). 'Determination of Collision Criteria and Causation Factors Appropriate to a Model for Estimating the Probability of Maritime Accidents'. *Ocean Engineering* 40: 50–61.

1. The Vulnerabilities

The prima-facie risks that the Salish Sea faces from a serious accident involving international shipping are those related to:

1. The territories, resources, practices and commercial enterprises of indigenous groups.⁶
2. Endangered Species, with overlapping national, regional and international conservation obligations for, inter alia, bird life,⁷ marine mammals (and the Southern Resident Killer Whale in particular),⁸ fish, and specifically Chinook salmon.⁹
3. Protected areas, ranging from the World Heritage Olympic National Park, the Olympic Coast National Marine Sanctuary (already an IMO Area to be Avoided), sites protected under the 1966 National Historic Preservation Act,¹⁰ and a multitude of local marine protected areas.¹¹ Of note, in 2013 President Obama signed a proclamation creating the San Juan Islands National Monument. This covers recreational areas, cultural sites, historic sites, and endangered habitats.¹²
4. A tourist economy, heavily based around the natural values of the area. For example, the San Juan Islands, alone, receive around 700,000 tourists per year, in an industry worth over \$158 million per year. This tourism, as with all nature-related tourism in the region has very strong growth potential if carefully managed. However, any major

⁶ Norman, E. (2013). 'Spatial Politics, Ecocolonisation and the Politics of Calculation in Boundary Bay'. *Area*. 45 (2): 100-114; Ayers, C. (2012). 'An Exploration of Salish Peoples' Attitudes Towards the Establishment of No-Take Zones Within the Salish Sea'. *The Canadian Geographer*. 56(2): 72-89; Castleden, H. (2012). 'Community Based Participatory Research Involving Indigenous Groups in Canadian Geography'. *The Canadian Geographer*. 56 (2): 69-81; Townsend, C. (2011). 'Not a Museum But a Cultural Journey'. *The Journal of the Royal Anthropological Institute*. 17(1): 67-82; Singleton, S. (2009). 'Native People and Planning for Marine Protected Areas: How Stakeholder Processes Fail to Address Conflicts in Complex, Real World Environments'. *Coastal Management*. 37 (5): 340-360; Wahbe, T. (2007). 'Building International Indigenous Peoples' Partnerships'. *Ecohealth*. 4(4): 17-34; Fraser, D. (2006). 'Collaborative Science, Policy, Development and Program Implementation in the Transboundary Georgia Basin/Puget Sound'. *Environmental Monitoring and Assessment* 113 (1) 134-150; Hilderbrand, L. (2002). 'Cooperative Ecosystem Management Across the Canada-U.S. Border'. *Ocean and Coastal Management*. 45 (6): 189-192; Trosper, R. (2002). 'Northwest Coast Indigenous Institutions That Supported Resilience and Sustainability'. *Ecological Economics*. 41(2): 103-134.

⁷ Domico, T (2007). *Natural Areas of the San Juan Islands*. (Turtleback, Washington). 59-64, 81, 158. Johnson, C & J (2011). *Birds and Habitats of the Puget Sound Area* (Orange Spot, Seattle). Downing, J. (1983). *The Coast of Puget Sound*, (University of Washington Press, Seattle). Washington Department of Fish and Wildlife Program (2009). *Status and Trends of Marine Birds in Washington's Southern Puget Sound*. (WDFW, Seattle). 7-8. Washington Department of Fish and Wildlife (2006). *Nearshore Birds in Puget Sound* (Washington Department of Fish and Wildlife Technical Report 2006-05, Seattle). A number of species which frequent Puget Sound, which forms part of the Pacific Flyway, are listed as protected under the Migratory Bird Treaty Act. Note also the *North American Waterfowl Management Plan between Canada and the United States*.

⁸ National Marine Fisheries Service (2011). *Southern Resident Killer Whales: Five Year Review* (NMFS, Seattle); NOAA (2008). *Recovery Plan for Southern Resident Killer Whales*. (NOAA, Washington). 2, 56-58; Department of Commerce, NOAA, *Endangered Status for Southern Resident Killer Whales*. 50 CFR Part 224. Final Rule. As printed in the Federal Register /Vol. 70, No. 222 / Friday, November 18, 2005 /Rules and Regulations 69907.

⁹ National Marine Fisheries Services (2012). *The Effects of Salmon Fisheries on Southern Resident Killer Whales: Final Report of the Independent Science Panel*. (NOAA, Seattle). 3-4. National Marine Fisheries Service (2011). *Southern Resident Killer Whales: Five Year Review* (NMFS, Seattle). 6; NOAA, *Endangered and Threatened Species; 5-Year Reviews for 17 Evolutionarily Significant Units and Distinct Population Segments of Pacific Salmon and Steelhead*. 50448 Federal Register / Vol. 76, No. 157 / Monday, August 15, 2011 / Proposed Rules. Note the Fish and Wildlife Coordination Act, the Magnus-Stevens Fishery Conservation and Management Act-Essential Fish Habitat, and international conservation efforts under the 1985 Pacific Salmon Treaty.

¹⁰ McNulty, T. (2009). *The Olympic National Park: A Natural History*. (University of Washington Press, Seattle). 249-250; Gillespie, A. (2012). *Conservation, Biodiversity and International Law*. (Edward Elgar, London). Chapter 7; Department of Commerce/NOAA (2000). *Olympic Coast National Marine Sanctuary: Area to be Avoided*. (Marine Sanctuaries Conservation Series MSD-00-1).

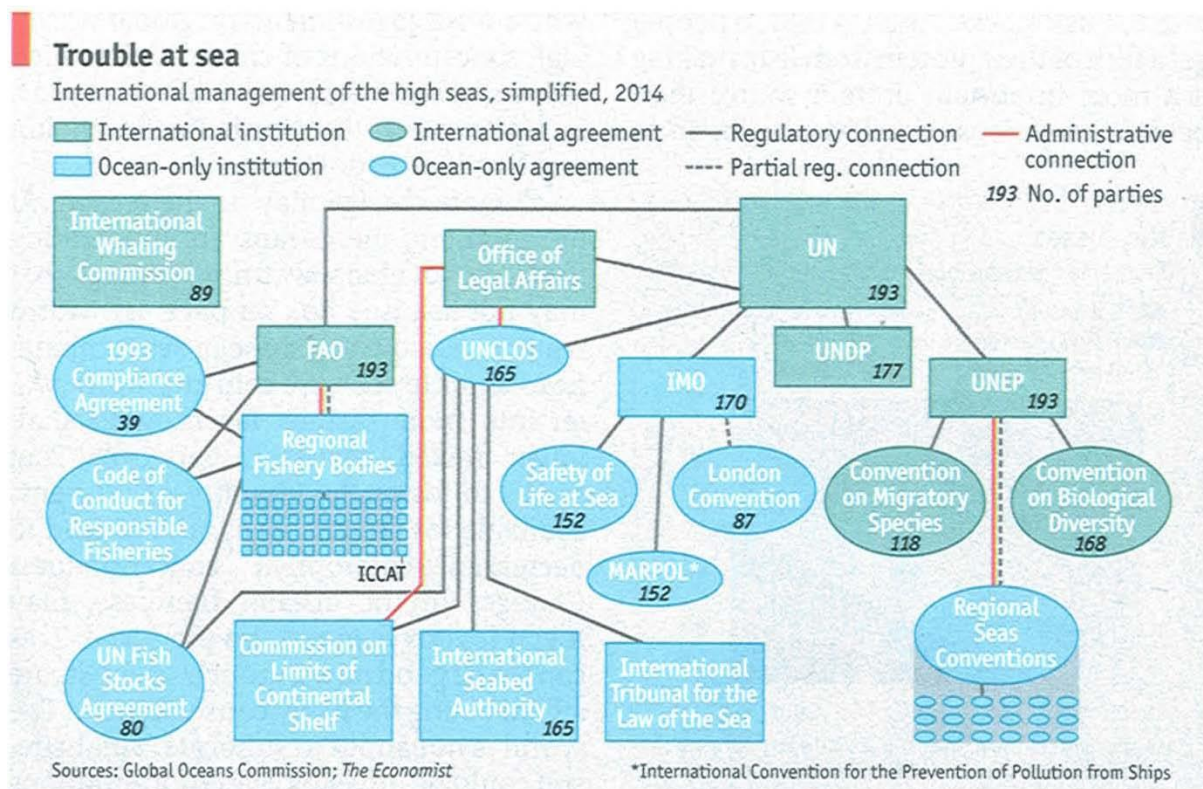
¹¹ Washington Department of Fish and Wildlife (2009) *Marine Protected Areas in Washington*. (WDFW, Washington). 2. Don, C. (2002). 'Could the San Juan Islands National Wildlife Refuge Serve to Protect Marine Areas?' *Coastal Management*. 30: 421-426. Tuya, F. et al. (2000). 'An Assessment of the Effectiveness of Marine Protected Areas in the San Juan Islands'. *ICES Journal of Marine Science*. 57: 1218-1226; Domico, T (2007). *Natural Areas of the San Juan Islands*. (Turtleback, Washington).

¹² www.sanjuanislandsnca.org

shipping accident could destroy this industry (as well as other industries reliant on the natural environment, such as fishing and real estate) to produce an economic impact in the billions of dollars.¹³

2. The International Solution

The core problem is that the source of the risk is international, whilst any potential impacts will be felt locally. However, the local community, even through its national offices, is limited in what it can do as this area – international maritime law – is governed through a complex set of obligations, arrangements and organizations (as this below diagram attempts to show). Often, this labyrinth is sufficient to put many conservationists off seeking international solutions to maritime problems. However, if this labyrinth can be negotiated, the most effective solutions will be secured.



In this instance, the particular problem is the transit of international traffic through areas which are particularly vulnerable. The governing regime, the United Nations Convention on the Law of the Sea (UNCLOS) strikes a balance between freedom of passage and transit through the territorial sea and/or international straits, and the ability of coastal states to establish various protections to prevent accidents in their waters. In both instances, if restrictions are to be imposed on free transit, the strong ideal is that the restrictions are pursued either through, or in accordance with, international law.

¹³ For the popularity see, for example, the New York Times, The 41 Places to Go in 2011; National Geographic Traveller, The Best Trips for Summer 2011; Lonely Planet: US Islands That Won't Break the Bank. Dolesh, R. (2011). 'Assessing the Value of Feathered Workers: Birds Perform a Multitude of Services that Contribute to Our Well-Being'. *Birder's World* 25(4): 12-20; For the figures, see Dean Runyan Associates (2009). *The Economic Impacts to Visitors of Washington State Parks*. ; IUCN (2003) 'Protected Areas as Engines for Development.' *Parks* 13 (3), 1-71.

The territorial sea (12 miles from land) is part of the sovereign territory of a State.¹⁴ Although the territorial sea is part of state territory, as far as vessels are concerned, the principle of freedom of navigation affects the legislative options of coastal states to a great extent, as this sovereignty is, 'subject to this Convention (UNCLOS) and to other rules of international law'.¹⁵ This is most obviously so in the case of innocent passage of which international vessels are, in theory, entitled to through the territorial sea. In this area, the coastal state may adopt laws and regulations, in conformity with international law, relating to innocent passage through the territorial sea, in respect of the safety of navigation and the regulation of maritime traffic; the protection of navigational aids, the conservation of the living resources of the sea; and the preservation of the environment of the coastal State and the prevention, reduction and control of pollution thereof.¹⁶ The most obvious tool that can be utilised in this area is sea lanes and traffic separation schemes – especially for tankers and/or other ships carrying inherently dangerous material - in the territorial sea.¹⁷ In doing so, the coastal state shall forward the recommendations of the competent international organization.¹⁸

Similar restrictions on innocent passage exist with international straits. International straits save shipping time, and are often, the only route to a destination. Due to the fact that a coastal State can stop innocent passage through their territorial sea, important gateways could be cut very quickly. This option has huge economic and military implications. Accordingly, international law has created an extensive regime on when traffic in straits can be restricted.¹⁹ The broad rule is international shipping using, 'straits which are used for international navigation between one part of the high seas or an exclusive economic zone and another part of the high seas or an exclusive economic zone'²⁰ have a right of [continuous and expeditious] transit passage.²¹ This point is particularly important in the context of the Salish Sea, as the Juan da Fuca Strait, with commitments dating back to the Oregon Treaty of 1849 between Canada and the United States, is recognised as one of the major straits of the world.²²

The importance of restrictions over this (and other) straits of international importance is that international shipping must comply with generally accepted international regulations, procedures and practices for safety at sea, and comply with generally accepted international regulations, procedures and practices for the prevention, reduction and control of pollution from ships.²³ Particular options exist for sea lanes and traffic separation schemes (where necessary to promote the safe passage of ships) – but this should be done cooperatively between border States, and through the competent international organization with a view to their adoption.²⁴ States bordering straits may also adopt laws and regulations relating to transit passage through straits, in respect of the safety of navigation and the regulation of maritime traffic²⁵; the prevention, reduction and control of pollution, [by giving effect to applicable international regulations regarding the discharge of oil, oily wastes and other noxious substances in the strait]. Importantly, such laws and regulations cannot discriminate

¹⁴ Articles 2 and 3 of UNCLOS.

¹⁵ Article 2(3).

¹⁶ Article 21.

¹⁷ Article 22.

¹⁸ Namely, the IMO, the 1972 Collisions Regulations Convention, and the SOLAS 1974.

¹⁹ Note also, the ICJ in the Corfu Channel Case 1949. 4-37, at 28.

²⁰ Article 37.

²¹ Article 38 and 45.

²² See Rothwell, D.(2010). *The International Law of the Sea*. (Hart, Oxford). 230; Bruel, E. (1947). *International Straits*. (London, Sweet and Maxwell). I: 44-45.

²³ Article 39.

²⁴ Article 41.

²⁵ Note, SOLAS REG V/8-1, now REG 11, allows compulsory ship reporting when in straits.

in form or in fact among foreign ships or in their application have the practical effect of denying, hampering or impairing the right of transit passage.²⁶

The importance of taking action to prevent, reduce and control pollution of the marine environment, especially that, which is rare or fragile, and/or the habitat of depleted, threatened or endangered species and other forms of marine life is a key part of UNCLOS.²⁷ To achieve this, the emphasis is upon global and/or regional cooperation.²⁸ UNCLOS is clear that the goal is to act through the competent international organization to establish rules and standards to control pollution of the marine environment from [international] vessels and promote the adoption of routing systems designed to minimize the threat of accidents which might cause pollution of the marine environment, including that of coastal States.²⁹ Within this ambit, the option exists³⁰ to establish,

Clearly defined area of their respective exclusive economic zones is an area where the adoption of special mandatory measures for the prevention of pollution from vessels is required for recognized technical reasons in relation to its oceanographic and ecological conditions, as well as its utilization or the protection of its resources and the particular character of its traffic,

At all points, the right to make restrictions is balanced against trying not to unnecessarily hamper the innocent passage of foreign vessels, and again to work through the competent international organizations. This means that the global community frowns upon the adoption of unilateral domestic measures which have no foundation in international law, which restrict international shipping. This type of unilateral action (unless followed, and becomes the norm: as the US did with its Oil Pollution Act of 1990) could be the subject of diplomatic and legal disagreement as what is being restricted has rights in international law that cannot lightly be trampled. The risks of 192 sovereign countries all adopting what their own unilateral actions to restrict international shipping are axiomatic.

International law prefers that the domestic actions of States are in accordance with international instruments, or better still, going through an act of an international organisation that has been conferred competencies with respect to the protection of specific areas. In the case of maritime issues involving international traffic, the preferred option is acting through international organisations.³¹ This is because the risks posed by global shipping are an international problem, and foreign ships, by designation, are not domestic. Restrictions on international shipping should be done, internationally. This is particularly important because international ships operate on principles based around traditional themes contemporarily in the UNCLOS, protecting freedom of navigation and the right of free transit.

3. Existing Practice of the United States and Canada to Protect the Environment from the Threat of International Shipping

²⁶ Article 42. Note, article 43 for navigational aids in straits.

²⁷ Article 194.

²⁸ Article 197.

²⁹ Article 211.

³⁰ Article 216 (a).

³¹ Kachel, M (2008). *Particularly Sensitive Sea Areas*. (Springer, NYC). 51.

Air pollution is a recent example of cooperation between the United States and Canada to protect the environment, through international law, from the threat posed by the risks of air pollution caused by international shipping. Working through Annex IV (air pollution) to the 1973/1978 International Convention for the Prevention of Pollution from Ships (MARPOL), standards on both nitrogen and sulfur have been implemented. The standards on the oxides of nitrogen have been dealt with through ever increasing technical standards whereby emissions must be kept below levels which are tagged to the amount of revolutions per minute of different engine sizes, dependent on their date of manufacture.³²

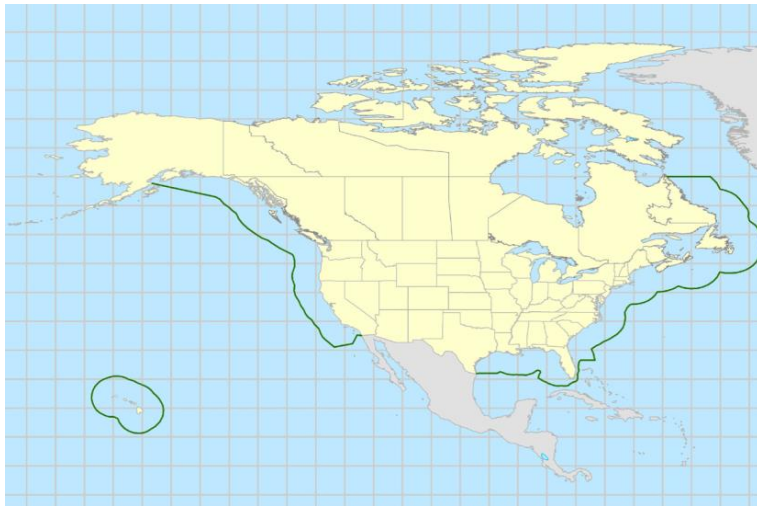


Figure 1: North American Emission Control Areas ¹

Conversely, oxides of sulphur are dealt with by restricting the type of fuel oil that may be used on board ships. Specifically, the sulphur content of any fuel used on board ships shall not exceed a given amount of its total volume.³³ This figure, which originally started at 4.5%, has been progressively lowered to 3.5% in 2012, with the goal of reducing it to 0.5% in 2020 or 2025.³⁴ Unhappy with these limits, two regions have campaigned for the recognition of special Emission Control Areas (ECA) in which even higher standards are applied. The Baltic Sea and the North Sea have been designated emission control areas for sulphur pollution, by which the sulphur fuel content in the area cannot rise above 0.5% with a subsequent revision downwards to 0.1%.³⁵

The United States and Canada then followed suit in an attempt to make the regulation of air pollution from such vessels of the highest possible standards.³⁶ In 2010, the IMO officially designated waters off North American coasts as an area in which stringent international emission standards will apply to ships. For this area, the effective date of the first-phase fuel sulfur standard is 2012 and the second phase begins in 2015. Beginning in 2016, high standards for the emission of nitrogen oxides also become applicable. The results of these standards are expected to be that by 2020, emissions from these ships operating in the North American ECA are expected to be reduced annually by 320,000 tons for oxides of nitrogen, 90,000 tons for fine particulate matter, and 920,000 tons for oxides of sulphur, which is 23%, 74%, and 86%, respectively, below predicted levels in 2020 absent the ECA.³⁷

³² See Regulation 13 of Annex VI of the 1973 International Convention for the Prevention of Pollution from Ships (MARPOL). This is reprinted in IMO (2003). MARPOL 73/78. (IMO, London). 408. Also, Anon. (2008). 'IMO Environment Meeting Approves Revised Regulations on Ship Emissions'. *IMO News*. 2: 7.

³³ See Regulation 14 of Annex VI. Ibid. 410.

³⁴ Anon. (2007). 'Marine Environment Protection Committee Progresses Key Issues'. *IMO News*. 2007 (3): 21. MEPC. (2004). Report of the MEPC on its 52nd Session. MEPC. 52/WP.13. 23.

³⁵ Matthias, V. (2010). 'The Contribution of Ship Emissions to Air Pollution in the North Sea Regions'. *Environmental Pollution* 158 (2010) 2241-2250. Anon. (2008). 'North Sea SECA Now In Effect'. *IMO News*. 2008 (1): 6. Annex 6. Availability and Use of Low Sulphur Bunker Fuel Oils in SOx Emission Control Areas Designated in Accordance With Regulation 14(3) of Annex VI of MARPOL. MEPC. Report of the MEPC on its 44th Session. MEPC 44/20 (2000). 58-60. This was later confirmed by the IMO in Resolution A.926 (22).

³⁶ Anon. (2009). 'US Coastal Clean Up'. *New Scientist*. April 4. 4.

³⁷ <http://www.imo.org/mediacentre/pressbriefings/pages/28-eca.aspx>. Also, Kotchenruther, R. (2013). 'A Regional Assessment of Marine Vessel PM2.5 Impacts in the U.S. Pacific Northwest'. *Atmospheric Environment* 68: 103-111. Tran,

4. Particularly Sensitive Sea Areas

Given the example above, of how international solutions have been cooperatively pursued by the United States and Canada to regulate one particular type of environmental threat posed by international shipping, the obvious question becomes, what similar options exist to protect regions which are culturally, economically and environmentally sensitive from the risk of accidents related to international shipping ? The answer to this question is a Particularly Sensitive Sea Area (PSSA).

A PSSA is defined as, ‘an area that needs special protection through action by the International Maritime Organization (IMO) because of significance for recognized ecological, socioeconomic or scientific reasons and because it may be vulnerable to being damaged by international shipping activities’.³⁸ PSSAs, which can encompass oceanic waters which are territorial, within an EEZ and/or international straits, are a balance between the protection of high value environments (of a coastal State) and the freedom of transit on the oceans. It is also an instrument which pulls together and synchronizes very complex, and often conflicting, domestic and international, legal and policy goals. A PSSA is the ultimate instrument that the global community can adopt to protect an area from the threats posed to it by international shipping. Although many of these measures advanced through a PSSA can be done domestically, the advantages of going through the international processes are,

1. Added value. If a PSSA is recognised by the international community, it alters perceptions of the area and raises its profile. This is especially so because to become a PSSA is a complicated and difficult processes, and is only pursued for areas of high value and high risk. The global recognition of these considerations changes perceptions of an area.
2. An opportunity to review and add further Protective Measures, beyond what was originally agreed. It is, thus, a chance to look at the matter with somewhat of a clean slate.
3. It notifies mariners of sensitive areas, and these notations (as charted through the International Hydrological Organisation) are global.
4. Can lead to shipping companies changing practices, supporting endeavours (changing their own practices, because of reputational benefits).³⁹

To date, PSSAs have been designated in 14 areas.⁴⁰

T. (2012). ‘Potential Impacts of an Emission Control Area on Air Quality in Alaska Coastal Regions’. *Atmospheric Environment* 50 : 192-202

³⁸ Hazmi, M. (2012). ‘Protecting vital sea lines of communication: A study of the proposed designation of the Straits of Malacca and Singapore as a Particularly Sensitive Sea Area’. *Ocean & Coastal Management* 57: 79-94; Broder, S. (2011). ‘Particularly Sensitive Sea Areas-Protecting the Marine Environment in the Territorial Seas and Exclusive Economic Zones’. *Denver Journal of International Law and Policy*. 40(1): 472-300. Chalain, H. (2007). ‘Fifteen Years of Particularly Sensitive Sea Areas: A Concept in Development’. *Ocean and Coastal Law Journal*. 13(1): 47-65. Ottesen, P. (1994). ‘Shipping Threats and Protection of the Great Barrier Reef Marine Park: The Role of the Particularly Sensitive Sea Area’. *The International Journal of Marine and Coastal Law*. 9(4): 507-543. Gerard, P. (1994). ‘Particularly Sensitive Sea Areas-A Documentary History’. *The International Journal of Marine and Coastal Law*. 9(4): 469-482. Gjerde, K. (1993). ‘Protection of Particularly Sensitive Sea Areas under International Marine Environmental Law’. *Marine Pollution Bulletin*, 26(1): 9-13.

³⁹ Kachel, M. (2008). *Particularly Sensitive Sea Areas* (Springer, NYC). 179-180.



Figure 2: Location Map of the 14 PSSA's Designated by the International Maritime Organization

5. The Three Parts to a PSSA

There are three parts to a PSSA. First, the vulnerabilities to the environment, economy and/or cultural considerations, must be shown. Second, the risk to these, as produced by international shipping must be adduced. Finally, appropriate Associated Protective Measures must be agreed and adopted.⁴¹

PART I: Ecological, Social and/or Cultural Threat (*of which one must be met, ideally, throughout the entire area*):

Ecological criteria

- Uniqueness or rarity – ('only one of its kind');
- Critical habitat;
- Dependency –highly dependent on biotically structured systems (e.g. coral reefs, kelp forests, mangrove forests, seagrass beds);
- Representativeness;
- Diversity;
- Productivity (such as oceanic fronts, upwelling areas and some gyres)
- Spawning or breeding grounds;
- Naturalness –a relative lack of human-induced disturbance;
- Integrity – an effective, self-sustaining ecological entity;

⁴⁰ The Great Barrier Reef, Australia (designated a PSSA in 1990); The Sabana-Camagüey Archipelago in Cuba (1997); Malpelo Island, Colombia (2002); The sea around the Florida Keys, United States (2002); The Wadden Sea, Denmark, Germany, Netherlands (2002); Paracas National Reserve, Peru (2003); Western European Waters (2004); Extension of the Great Barrier Reef PSSA to include the Torres Strait (Aus and Papua New Guinea) (2005); Canary Islands, Spain (2005); The Galapagos Archipelago, Ecuador (2005); The Baltic Sea area, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden (2005); The Papahānaumokuākea Marine National Monument, United States (2007); The Strait of Bonifacio, France and Italy (2011); The Saba Bank, in the North-eastern Caribbean area of the Kingdom of the Netherlands (2012).

⁴¹ IMO Res A.982(24) Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas.

- Fragility – due to water temperature, salinity, turbidity or depth, low flushing rates, and/or oxygen depletion;
- Bio-geographic importance -rare biological, chemical, physical, or geological features.

Social, cultural and economic criteria

- Social or economic dependency –including fishing, recreation, tourism, and the livelihoods of people who depend on access to the area;
- Human dependency –for the support of traditional subsistence or food production activities or for the protection of the cultural resources of the local populations;
- Cultural heritage – An area that is of particular importance because of the presence of significant historical and archaeological sites.

Scientific and educational criteria

- Research – An area that has high scientific interest;
- Baseline for monitoring studies –suitable;
- Education –exceptional opportunity to demonstrate particular natural phenomena.

PART II: Vulnerability to Impacts from International Shipping.

Vessel traffic characteristics

- Operational factors – Types of maritime activities (e.g. small fishing boats, small pleasure craft, oil and gas rigs) in that may reduce the safety of navigation;
- Vessel types – (e.g. high-speed vessels, large tankers, or bulk carriers);
- Traffic characteristics – Volume, concentration, interaction, distance offshore or other dangers to navigation;
- Harmful substances carried.

Natural factors

- Hydrographical – Water depth, bottom and coastline topography;
- Meteorological – Prevailing weather, wind, visibility;
- Oceanographic – Tidal streams, ocean currents, ice... which increase risk of collision.

Additional information

- Significance and degree of risk of the potential damage, and whether such damage is reasonably foreseeable, as well as whether damage is of a recurring or cumulative nature;
- History of groundings, collisions, or spill;
- Adverse impacts to the environment outside the proposed PSSA;
- Stresses from other environmental sources; and
- Any measures already in effect and their actual or anticipated beneficial impact.

PART III: Associated Protective Measures (APMs)

All APMs must be approved by the IMO, and can include:

- Designation of an area as a Special Area under MARPOL Annexes
- Adoption of ships' routing and reporting systems near or in the area, under the International Convention for the Safety of Life at Sea (SOLAS)
- Development of other measures aimed at protecting specific sea areas, provided that they have an identified legal basis (such as UNCLOS).
- Consideration should also be given to the potential for the area to be listed on the World Heritage List, declared a Biosphere Reserve, or included on a list of areas of international, regional, or national importance.

In practice, the way this works is that all IMO member governments are obligated to ensure that ships flying their flag comply with the APMs for that area.⁴² To date, the types of APMs adopted are,

- i. IMO recommended pilotage (Great Barrier, Torres Strait, Wadden, Baltic).
- ii. Mandatory reporting (Great Barrier, Wadden, Western European Waters, Canaries, Galapagos, Papahānaumokuākea).
- iii. Traffic separation schemes (Sabana, Wadden, Torres, Canaries, Baltic).
- iv. Area to be avoided (Sabana, Malpelo, Florida Keys, Paracas, Canaries, Galapagos, Baltic, Papahānaumokuākea, and Saba).
- v. Discharge prohibitions (MARPOL Special Area (Wadden, Baltic, Sabana).
- vi. No anchoring areas (Florida Keys, Saba).⁴³
- vii. Vessel Traffic Services.⁴⁴

⁴² IMO, Assembly, Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, Resolution A. 982 (Dec. 1, 2005).

⁴³ MEPC (2007). List of PSSAs Including Relevant APMs. MEPC 57/7/1. Nov 26, 2007.

⁴⁴ Vessel Traffic Services (as overlapping with guidance from the International Maritime Organisation) provides active monitoring and navigational advice and assistance for vessels in particularly areas which are confined and busy waterways, thereby improving the safety and efficiency of navigation, safety of life at sea and the protection of the marine environment. Advanced traffic organization (such as priority position, allocation of space, routes to be followed, and speed limits to be observed); navigational assistance, and overlapping technologies such as radar and other direction finding, location and management tools, combined with appropriate personnel, and a strong and supportive flow of information (for example reports on the position, identity and intentions of other traffic; waterway conditions; weather; hazards; or any other factors that may influence the vessel's transit) essential for making informed on-board navigational decisions. VTS is governed by the 1974 Safety of Life at Sea (SOLAS) Convention, Chapter V, Regulation 12, together with the Guidelines for Vessel Traffic Services, IMO Resolution A.857(20), as adopted by the IMO, on November 27, 1997.

6. Particularly Sensitive Sea Areas in Practice

A. The Great Barrier Reef and the Torres Strait.⁴⁵

The first PSSA designation was in 1990 with Australia's Great Barrier Reef. It was later extended to include the Torres Strait in 2005. It now extends 1,430 miles along the east coast of Queensland and covers an area of 215,000 square miles, passing through both Australia's territorial sea and its EEZ.⁴⁶



I. Ecologically

1. Two ocean systems.
2. Limited water exchange in and out of Torres Strait, concern that pollution could sit.
3. Massive fresh water and sediment from nearby coastal rivers.
4. Notable ecosystems - benthic communities, fish assemblages, sea grass coverage and coral communities.
5. Critical habitat – especially for dugongs, green and flatback turtles.
6. Only 18 islands inhabited in Torres Strait, thus high degree of natural and wilderness value.

II. Culturally and Economically

⁴⁵ Res MEPC.44(3), updated MEPC.133(53). Adopted July 22nd, 2005. Full details are in MEPC 49/8. Para 3.1 to 3.3.3 for ecological, and 4.1 to 4.3 for vulnerability.

⁴⁶ See the IMO, MEPC, Identification of the Great Barrier Reef Region as a Particularly Sensitive Area, Annex, IMO Marine Env't Prot. Comm. Res. 44 (30) (Nov. 16, 1990). Also, Australia Government, Australian Maritime Safety Authority [AMSA], The Torres Strait Particularly Sensitive Sea Area, available at http://www.amsa.gov.au/Marine_Environment_Protection/Torres_Strait (last visited December 22, 2012).

1. Several thousand people live in small coastal communities. On the islands off Torres Strait – many indigenous people, highly dependent on the local environment, especially hunting dugongs.
2. Commercial fisheries (for prawns, mackerel, lobster, reef fish, pearl oysters) providing 35 million per year (in the year 2000) from commercial operations.
3. Tourism - Around 1.2 million visitors' days per annum with an economic value of the Reef about \$1,000 million per annum.

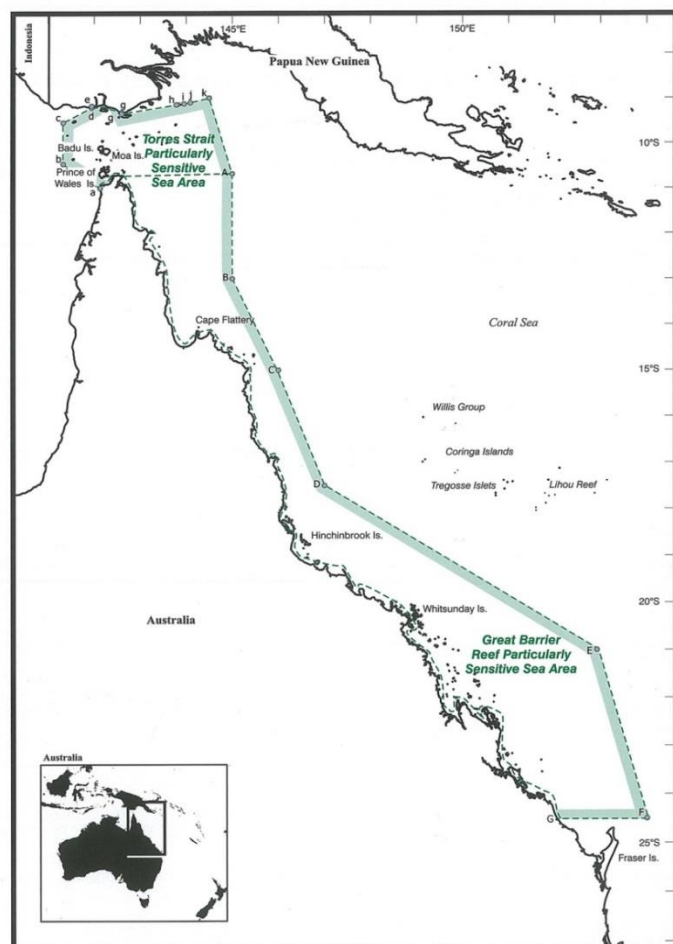
III. Vulnerability

1. The Torres Strait is used by large vessels trading between Southern Asia, Australia, NZ, South America, Papua New Guinea and Pacific Islands. Over 2000 ships per year.
2. It can often be very shallow, with strong currents. Torres Channel – only 10 to 15 m deep in the west. When passing through Gannet Passage, at low tide, underwater clearance is only 1 m. Strong need to watch tidal windows.
3. Many types of ships and cargoes, including dangerous and polluting. Also concentrations of fishing, tourist and recreational vessels.
4. A spill occurred in 1970 (Oceanic Grandeur).

III. Protective Measures

1. Two way shipping route.
2. Mandatory Reporting (for all vessels above 50 meters).
3. Pilotage. All vessels of 70 metres or more in length and all loaded oil tankers, chemical carriers and gas carriers of any length, must use the services of a pilot licensed by the Australian Maritime Safety Authority – IMO agrees: A710 (17).

Annex 6 – Great Barrier Reef PSSA and Torres Strait extension



GREAT BARRIER REEF AND TORRES STRAIT PSSAs

B. The Archipelago of Sabana-Camaguey.⁴⁷

The Sabana-Camagüey Archipelago was designated as a PSSA in September 1997. It is located in the north-central portion of the Republic of Cuba, extending for 465 kilometres between the Hicacos Peninsula and the Bay of Nuevitás. It is the most extensive island subgroup of the Cuban Archipelago, comprising more than 2,515 islands and small keys. Along its outer edge there is a coral reef 400 kilometres long.⁴⁸



I. Ecologically

1. Singular and unique on account of its natural scenery and associated biodiversity.
2. Predominance of cumulative carbonaceous island complexes not found elsewhere.
3. Almost all the habitats, ecosystems and biocenosis found in the different Caribbean islands are represented.
4. High degree of interdependency, both internal and external. Internally, there is a high degree of interaction and interdependence between the coastal and marine ecosystems, especially in the sequence of coastal lagoons/dune/systems/beaches/algae/coral reefs; and similarly in the combination of mangrove swamps/coastal lagoons/algae/coral reefs, which occurs most often and most extensively in the island group.

II. Culturally and Economically

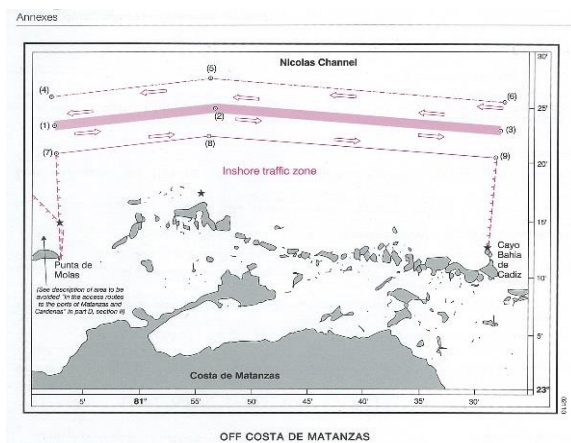
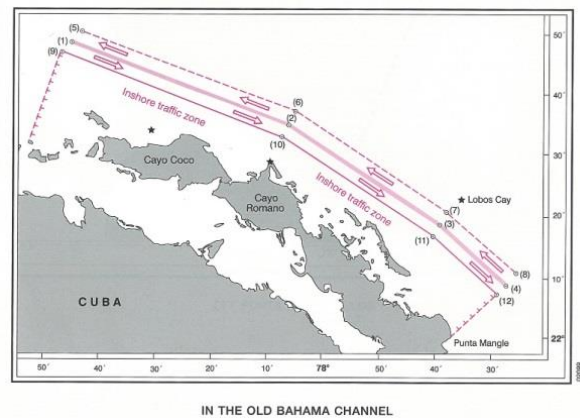
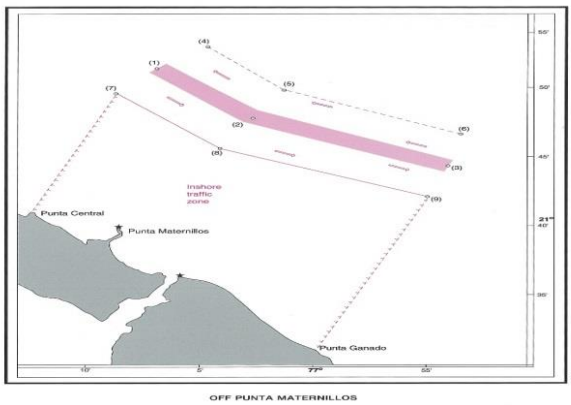
1. Is one of Cuba's three most productive fishery zones.
2. Extensive tourism market, based on scenery and ecological purity, already developed with plans for expansion.

III. Protective Measures

1. Traffic separation schemes (three of them). Two traffic lanes (each two miles wide) separated by a middle lane (one mile wide).
2. Inshore traffic zones.
3. Areas to be avoided (for ships over 150 tons).
4. Strict prohibitions on discharges of oil, garbage, packaging, harmful substances (of any type).

⁴⁷ Res MEPC. 74 (40). 1997, Sept 25.

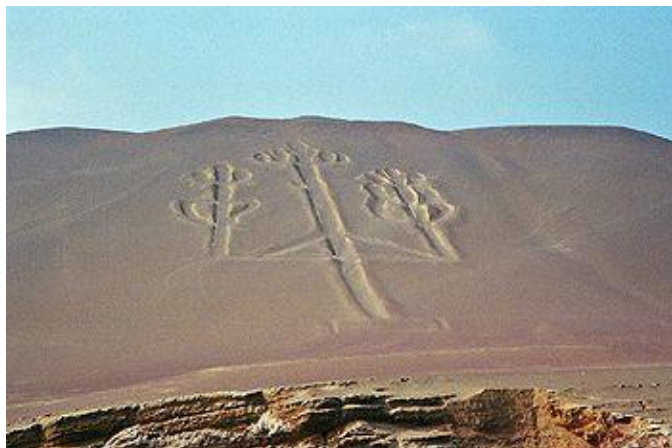
⁴⁸ Kristina, M. (1999). 'Cuba's Particularly Sensitive Sea Area in the Sabana-Camaguey Archipelago'. *International Journal of Marine and Coastal Law*. 14(3): 415-435.



Viewed as a whole, the Sabanna PSSA looks as it does, above, in the colour map. The three separate parts are reproduced to above.

C. The Paracas National Reserve.⁴⁹

The Paracas National Reserve is located in Ica, Peru, and consists of the Paracas Peninsula, coastal areas and tropical desert extending to the south slightly past *Punta Caimán*, a total of 335,000 ha (217,594 ha are marine waters and 117,406 are part of the mainland). The PSSA component covers the waters boxed in green, in the picture below.



I. Ecologically

1. One of most productive and rich areas of the world – 1543 identified species.
2. Keystone, bird life, seals and cetaceans. Endangered, otter, penguin and flamingo.
3. Key migratory route, especially for bird.

II. Socially and Culturally

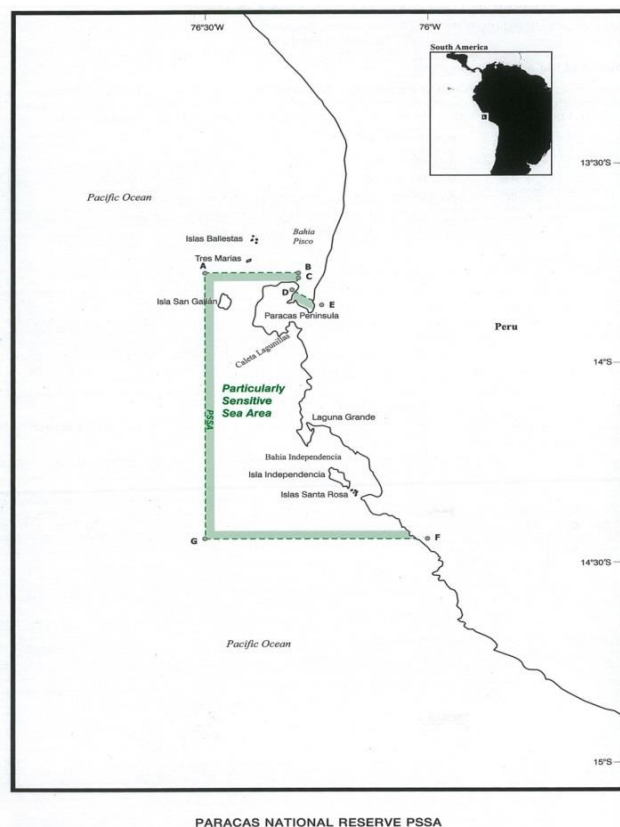
1. 120,000 visitors per year.
2. Great importance with historical cultural heritage (although this is mostly on land) related to the ancient indigenous peoples, mostly of the Paracas culture.

III. Vulnerability

1. Between 395-535 merchant ships per month.
2. Very windy.
3. Non-resilient ecosystems.

IV. Protective Measures

1. Already RAMSAR and CMS sites. Moving towards MAB.
2. Prohibition of tankers or other noxious substances (over 200 tons) in within the reserve (must follow other route to port).
3. All discharges, sewage, garbage prohibited.



⁴⁹ Res MEPC.106 (49).

D. The Western European Waters (WSW)⁵⁰

The WSW were designated as a PSSA in 2004, following the sinking of the *Prestige*, a single-hulled tanker which released over 20 million US gallons of oil into the sea.⁵¹



I. Ecologically

1. Seals, dolphins, 200 fish species, birdlife (puffins, terns, etc.).
2. Landscapes.
3. Ramsar sites, European Directive, Biosphere Reserves

II. Socially and Culturally

1. All areas vulnerable, but specifically drawn out, more than 50% of Portugal's population lives on the coast.

III. Vulnerability

1. 25% of the world commercial traffic converges towards the English Channel and onwards towards Northern Europe.

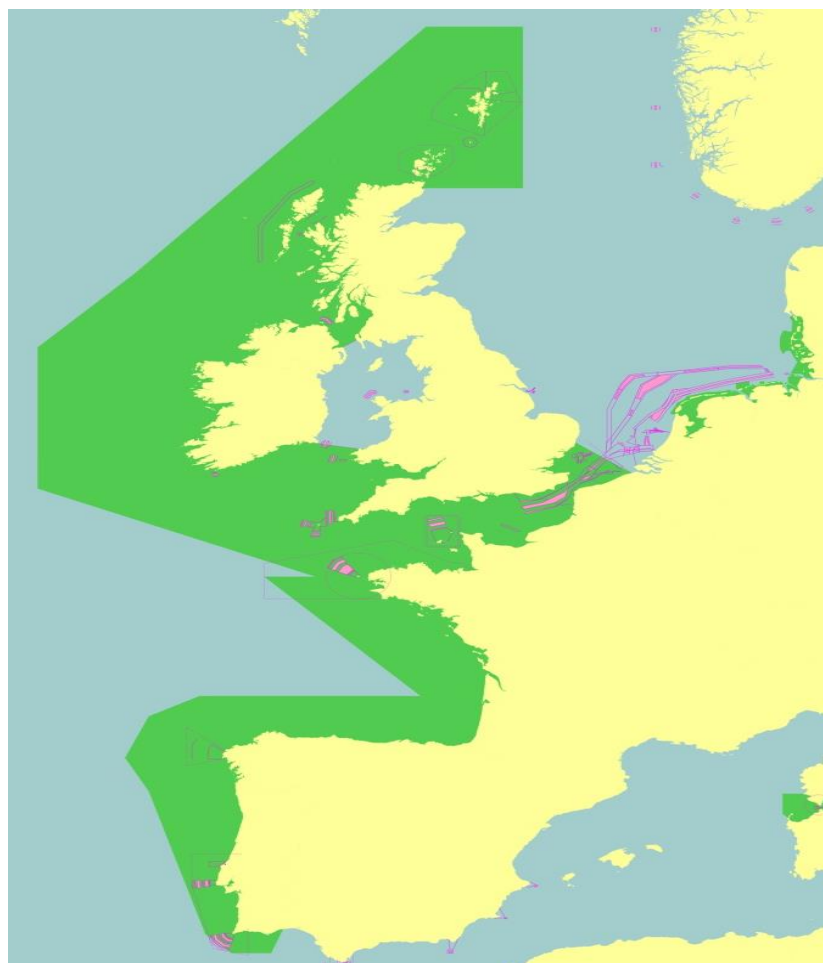
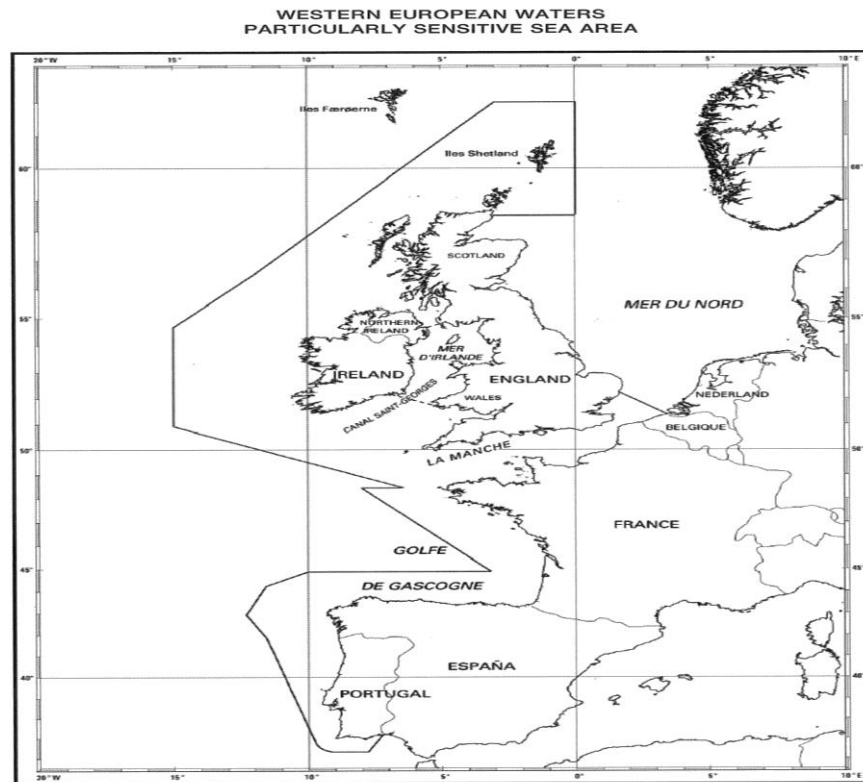
IV. Protective Measures

1. Traffic separation schemes.
2. Deep water routes in parts
3. Eight areas to be avoided
4. Mandatory Ship Reporting (for over 600 tons, carrying oil/bitumen).

⁵⁰ Res MEPC. 121 (52). 15 October, 2004. This established the new Mandatory Ship Reporting System as an APM. This slightly modified in 2009 – see MEPC, 59/24. July 27. 69... in accordance with SOLAR Reg V/11

⁵¹ Detjen, M (2006). 'The Western European PSSA—Testing a Unique International Concept to Protect Imperilled Marine Ecosystems'. *Marine Policy* 30: 442–453.

Of the two pictures below, while the first shows the extent of the PSSA, the second shows the location of some of the traffic separation schemes and ABAs.



E. The Canary Islands⁵²

The Canary Islands are a Spanish archipelago located 100 kilometers off the northwest coast of mainland Africa. They are considered very unique in terms of climate, landscape and natural features, making them highly desirable tourist destinations.



I. Ecologically

1. Specially listed region with EC for its biodiversity. Biosphere Reserve. 24 areas listed under European Habitat Directive, as part of 300 protected spaces.
2. 20 cetacean species, 500 species of fish, thousands of invertebrates; Petrel and osprey.

II. Socially and Culturally

1. Over 9 million tourists per year.
2. 80% of income for the region comes from tourism.

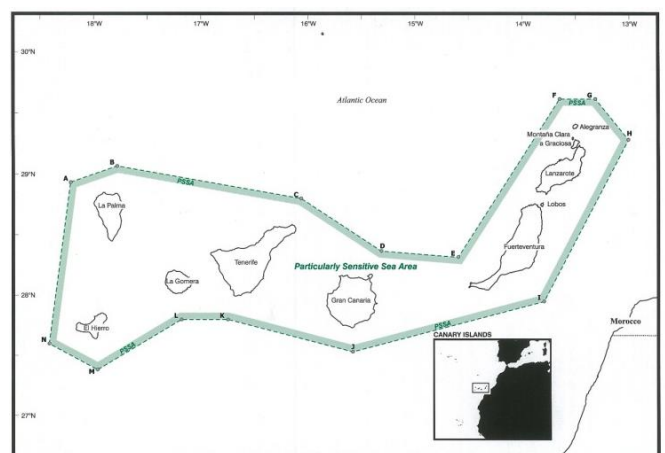
III. Vulnerability

1. Winds may magnify spills or accidents.
2. 1,500 vessels pass through per year.

IV. Protective Measures

1. Inshore traffic zones.
2. Five areas to be avoided (breeding grounds, biosphere reserves) by all ships over 500 tons.
3. Mandatory reporting.

Traffic separation schemes (and separation zone) can be seen in the colour map below.



⁵² Resolution MEPC. 134 (53). July 22, 2005.

F. The Galapagos Archipelago⁵³

The Galapagos Islands are an archipelago of volcanic islands distributed on either side of the Equator in the Pacific Ocean, just over 900 kilometers west of Ecuador. The islands are famed for the numbers and diversity of endemic species, made famous, by Charles Darwin.



I. Ecologically

1. The Galapagos are a World Heritage Area. Remarkably high number of land, water and/or coastal species. Reptiles, mammals and sea birds. Largely unspoilt.
2. Unique place due to ocean currents, upwelling zones and temperatures.

II. Socially and Culturally

1. Very important tourist destination.

III. Vulnerability

1. Three accidents between 1995 and 2005.
2. A few ships (2 or 3 per year) carrying pollutants and radioactive waste by reserves, general international traffic within 20 miles of Isabella island.

IV. Protective Measures.

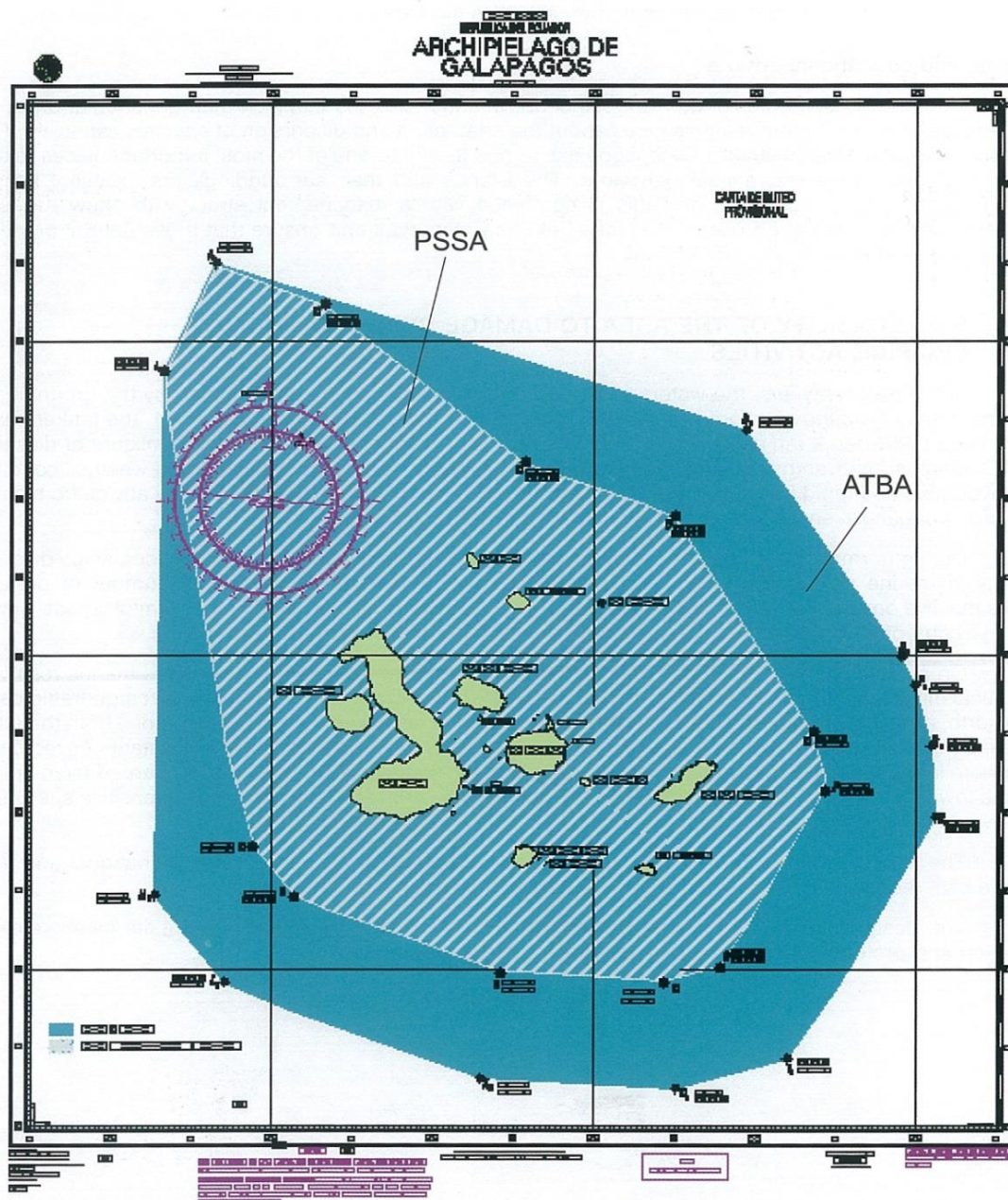
1. Large area to be avoided (almost a circle): this was largely modelled on the PSSA of Marpelo Island.⁵⁴
2. Mandatory ship reporting in PSSA

⁵³ Resolution MEPC. 135 (53).

⁵⁴ Res MEPC.97 (47). March 8, 2002.

Annex 2

Particularly Sensitive Sea Area and area to be avoided chart



Reference chart I.O.A.2 (1st Edition, 2003)
Datum Provisional América del Sur 1956 (La Canoa, Venezuela)

G. The Baltic Sea⁵⁵

The Baltic Sea is located between Central and Northern Europe. It is bounded by the Scandinavian Peninsula, the mainland of Europe and the Danish islands.



I. Ecologically

1. A globally unique and sensitive brackish-water ecosystem. The exchange of water is limited and slow, with low levels of salinity, with large parts being ice covered.
2. Although low number of species, what exists is unique.

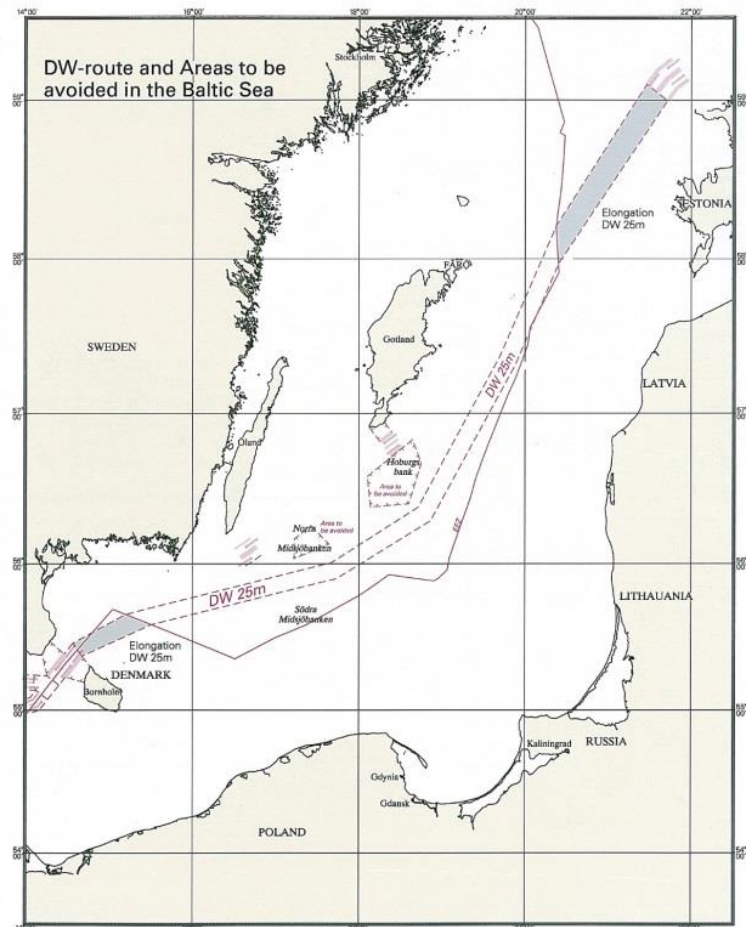
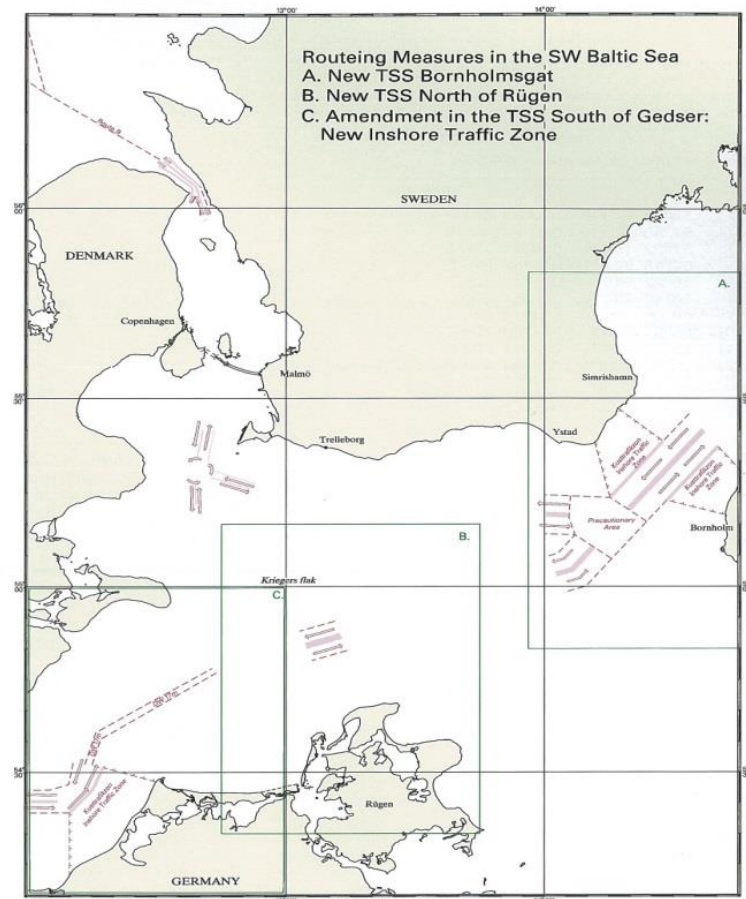
II. Vulnerability

1. Some of the densest traffic in the world.
2. More than 2,000 ships (down to fishing boats) are en-route in the area on an average day including 200 oil tankers.

III. Protective Measures

1. Traffic Separation Scheme
2. Inshore traffic zone
3. Area to be avoided

⁵⁵ Uggla, Y. (2007). 'Environmental Protection and the Freedom of the High Seas: The Baltic Sea as a PSSA from a Swedish perspective'. *Marine Policy* 31: 251–257.



H. The Papahānaumokuākea Area⁵⁶

The Papahānaumokuākea Marine National Monument is a World Heritage listed, U.S national monument, encompassing 360,000 square kilometers of ocean waters, including ten islands and atolls of the Northwestern Hawaiian Islands. It is renowned for both its cultural and natural values.⁵⁷



I. Ecologically

1. Pristine, integrated, fragile, coral reefs, seamounts, shoals etc., with over 7,000 marine species, apex going to sharks, jacks, seals, 14 million seabirds. Endangered turtles, sperm whale and albatross.
2. World Heritage Area, National Wildlife Refuge, Midway National Memorial and National Marine Monument.

II. Socially and Culturally

1. Sacred place to Native Hawaiian history and culture
2. 140 registered cultural sites
3. Importance in contemporary Native Hawaiian cultural traditions
4. Underwater heritage – over 120 vessels, including Battle of Midway.

III. Vulnerability

1. Although amount of international ship traffic was low, a single incident could be a disaster. Three recent instances, bunker fuel leaks (over 60 shipwrecks recorded in region).
2. Hydrological features are a challenge to navigation, as can be tropical storms.

IV. Protective Measures

1. Ship reporting. Areas to be avoided.

⁵⁶ As approved, Resolution MEPC 171 (57). Designation of the Papahānaumokuākea Marine National Monument as a Particularly Sensitive Sea Area, in MEPC 57/21 April 7, 2008. The resolution is in Annex 12. The full file on Papahānaumokuākea, Annex I to MEPC 57/7. Dec 4, 2007. Identification and Protection of Special Areas and Particularly Sensitive Sea Areas: Note by Secretariat. Also, United States, Designation of the Papahānaumokuākea Marine National Monument as a Particularly Sensitive Sea Area. MEPC 56/8. April 5, 2007. And, United States, Designation of the Papahānaumokuākea Marine National Monument as a Particularly Sensitive Sea Area. MEPC 56/INF.2. April 5, 2007.

⁵⁷ Anonymous (2008). 'Marine National Monument Designated Sensitive Sea Area'. *Sea Technology* 49 (5): 60-61. Also, Anon (2008). 'Papahānaumokuākea Marine National Monument designated a "Particularly Sensitive Sea Area''. *Ocean News & Technology* 14 (3): 20-21.

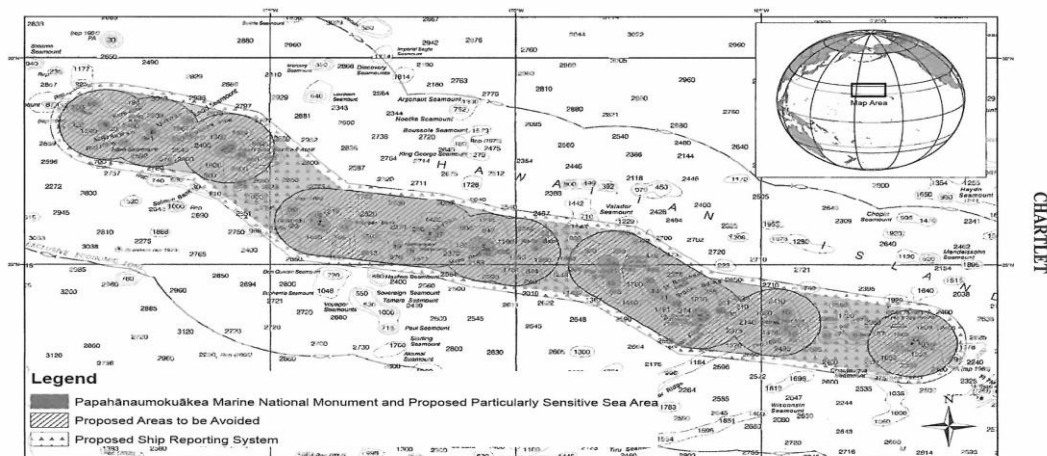


Figure 3: Areas to be avoided in the Papahānaumokuākea PSSA.

I. The Strait of Bonifacio⁵⁸

The Strait of Bonifacio is the strait between Corsica and Sardinia. It is 11 kilometers wide and, at maximum, 100 meters deep. It is notorious amongst sailors for its weather, currents, shoals and other obstacles.

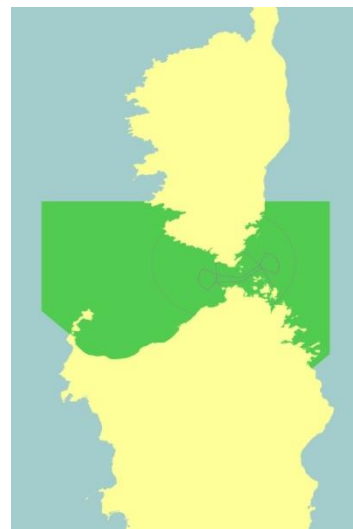


I. Ecological

1. Six Natura 2000 sites, three Habitat Directive sites, 12 sites of community significance, national parks, 33 species under Barcelona Convention and Protocol.
2. Especially important for European shag, Yelkouan shearwater, 77 under Birds Directive, 139 species under Berne Convention
3. Critically endangered leatherback, four endangered (fin whale, loggerhead, grouper and common seabream).

II. Vulnerability

1. Very strong winds and currents: IMO recommendation to



⁵⁸ France and Italy (2010). Designation of the Strait of Bonifacio as a PSSA. MEPC 61/INF.26. Sept 9, 2010. Also, MEPC 61/9, June 25, 2010; MEPC (2011). 'Proposal to List the Strait of Bonifacio as a PSSA'. This is Annex I in MEPC 62/WP.12.

- Member States to discourage transit in area. This followed tanker disaster in 1993.
- 35,000 transits over ten years. Dozens of merchant ships per day, and up to ten passenger ships, not to mention pleasure craft. [2,984 mandatory ship reports in 2009] 157 ships carrying dangerous goods transit, including 3 oil, three gas, five chemical.
 - Strong winds, complex morphology, numerous shoals and reefs.
 - 26 instances since 1972, mainly motor-boats and ferries, but also, three tankers.

III. Protective Measures

- Mandatory traffic separation scheme
- Area to be avoided
- Vessel traffic system – in accordance with SOLAS – when needed.
- Recommended/Mandatory pilotage.⁵⁹

J. The Saba Bank.⁶⁰

Saba Bank in the Caribbean Netherlands is the largest submarine atoll in the Atlantic Ocean, and is reputed to have some of the richest and diverse marine life in the Caribbean Sea.



III. Protective Measures

1. Areas to be avoided (for ships exceeding 300 ton)
2. Mandatory no anchoring zone.

K. The Sea Area Around the Florida Keys.⁶¹

The Florida Keys are a coral archipelago in the southeast United States. They begin at the southern tip of the Florida peninsula. At their outermost point, they are 140 kilometres from Cuba. The islands lie along the Florida Straits, dividing the Atlantic Ocean to the east from the Gulf of Mexico to the west.



I. Ecologically

1. The Keys have distinctive and unique plant and animal species. Both flora and fauna is known. Deer, crocodile and woodrat are endemic, whilst the Manatee is probably most famous. The Crocodile Lake National Wildlife Refuge, the Dry Tortugas National Park and most significantly, the Florida Keys National Marine Sanctuary.

II. Socially and Culturally

1. The tourism value of the region is significant

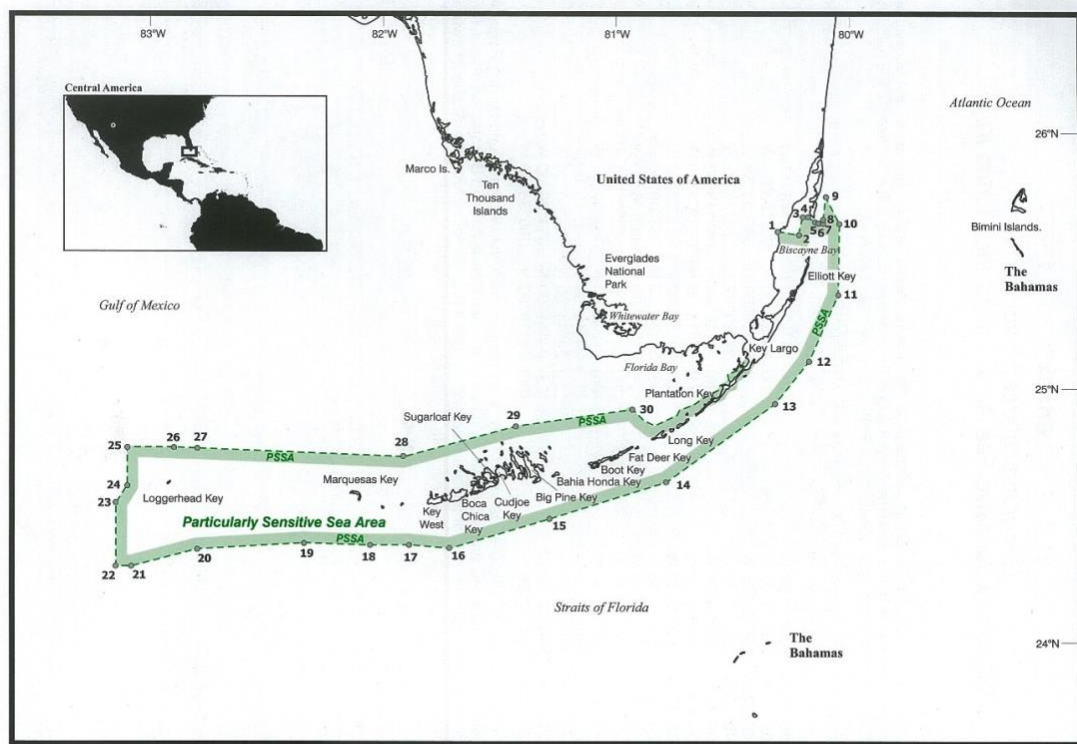
III. The Risk of Shipping

1. More than 40 percent of the world's commerce passes through the Florida Strait each year.
2. Since 1984, there have been 10 large ship groundings.

IV. Protective Measures

1. No anchoring areas
2. Areas to be avoided.

⁶¹ Res MEPC.98 (47). March 8, 2002.



FLORIDA KEYS PSSA

L. The Wadden Sea⁶²



The Wadden Sea is an exceptional, highly dynamic tidal ecosystem of global importance, which is sensitive to the impact of international shipping and other activities. The adjacent North Sea is one of the world's busiest areas in terms of international shipping and therefore the Wadden Sea fulfills the criteria for a PSSA designation. In 2002, the IMO designated major parts of the Dutch, German and Danish Wadden Sea as a PSSA.⁶³

I. Ecologically

1. Renown stretch of white beaches and salt marshes, with high landscape values.
2. Includes Ramsar sites, European Directives, Natura 2000 sites and Biosphere Reserves.

⁶² Wadden Sea. Res MEPC. 101 (48).

⁶³ <http://www.waddensea-secretariat.org/management/shipping-particularly-sensitive-sea-area-pssa>

II. Socially and Culturally

1. The tourism value of the region is significant

III. Protective Measures

1. Traffic Separation Schemes
2. Mandatory Routes for Heavy Tankers – Pilots recommended.
3. MARPOL Special Areas Annex V and VI.

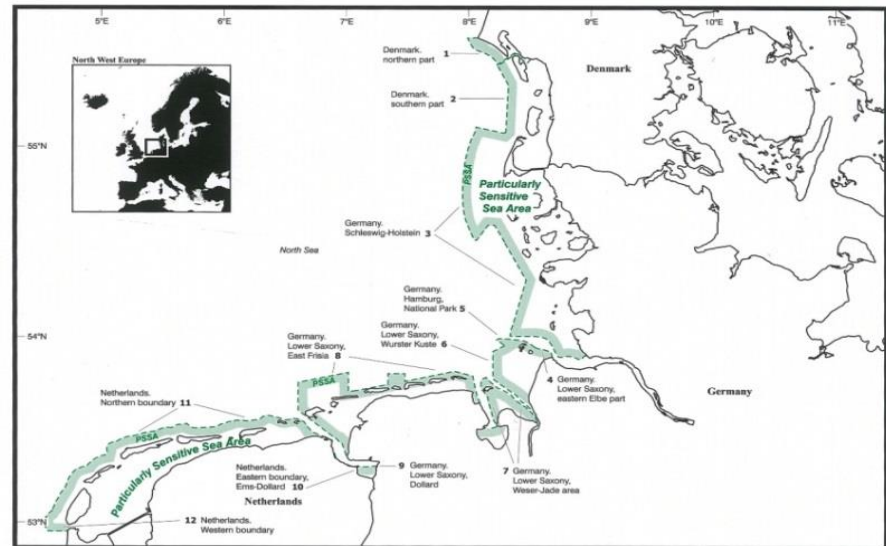
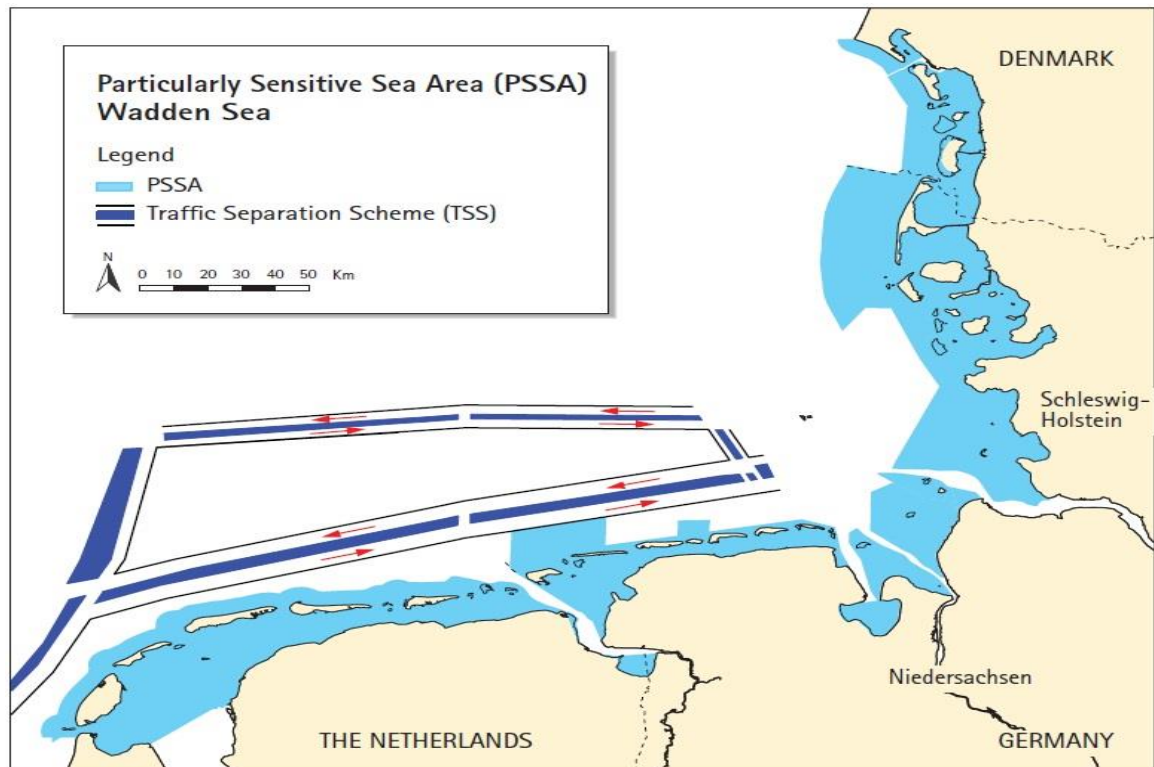


Figure 4: Wadden Sea PSSA and traffic separation schema.



7. Conclusion

The environmental threats raised from international shipping are best dealt with globally. The United States and Canada are already working together, through the correct international forums, to solve some of these problems. The one problem which has not been cooperatively dealt with is with Particularly Sensitive Sea Areas. Although the United States already has two of these, Canada has none. The Salish Sea would present the perfect example of how cooperation could be achieved in this area.

From the tentative evidence available, in terms of being particularly sensitive (in cultural, economic and environmental terms) – in comparison to other already listed PSSA sites, the Salish Sea probably fits. If recognised, each of these criteria would present an increased awareness, globally, of the values of this area. Similarly, in terms of the risks posed by international shipping (especially in terms of existing accidents, projected growth and hazardous material), the Salish Sea probably fits. Finally, in terms of Associated Protective Measures, the examples already adopted in other PSSAs would easily suit the regimes already covering this area. In addition to giving the chance to reconsider what extra safety standards could be adopted, by pursuing them internationally, the area would achieve a status that would fairly equate it to comparable areas of global significance (as opposed to the invisibility that it currently possesses).