Protecting marine biodiversity in the South Eastern Pacific Ocean

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World Maritime University

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PROTECTING MARINE BIODIVERSITY IN THE SOUTH EASTERN PACIFIC OCEAN

A Contribution for a Wider Regional Understanding and Cooperation in the Preservation and Sustainable Use of the Marine Environment and Living Resources

By

JAVIER PLATA GONZALEZ
Colombia

A dissertation submitted to the World Maritime University in partial Fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE
In
MARITIME AFFAIRS

Marine Environment and Ocean Management

2009

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DECLARATION

I certify that all the material in this Dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The content of this dissertation reflects my own personal views, and are not necessarily endorsed by the University.

Signature: 

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ACKNOWLEDGEMENTS

The Nippon Foundation and Dr. Yohei SASAKAWA, my deepest and sincere gratitude for make possible my highest dream as a person and a professional studying at the international integrated maritime community of the United Nations. This has been an inspiration for me and encouraged my studies on the protection of the marine environment and sustainable use of marine resources.

The Nippon Foundation my thankful expression to Mr. Takeju OGATA President and Executive Directors: Mr. Akira MAEDA, Mr. Ichiro MIURA, Mr. Masazumi NAGAMITSU, Mr. Shuichi OHNO, and Mr. Tatsuya TANAMI, whose daily work contributes to the best results of Sasakawa Fellows.

The Ocean Policy Research Foundation (OPRF) and Dr. Masahiro AKIYAMA, Chairman and Mr. Yoshio KON, President. Likewise, "Friends of WMU, Japan" Secretariat, WMU Sasakawa Fellowship Program, Mr. Eisuke KUDO, Executive Director; Mr. Eiji SAKAI, Chief Manager; and Mr. Shinichi ICHIKAWA Coordinator, and all the staff members whose support and encourage really provided an extra energy in my studies.

The World Maritime University (WMU) as a fundamental part of the International Maritime Organization (IMO) and to the United Nations. My special gratitude to Professor Clive Cole who from the first day encouraged my studies and provided great guide in the success of the MSc Programme, Professors Olof Linden and Neil Bellefontaine who structured the comprehensive knowledge in marine environment into my understanding, and Professors Proshanto Mukherjee and Max Mejia for their lectures on law of the sea and marine environmental law. Finally, to the staff of the University for their daily work in benefit of the whole Group 2009.

The United Nations Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs UN/DOALOS/OLA for the Seventeenth Hamilton Shirley Amerasinghe Memorial Fellowship on the Law of the Sea in 2002 that allowed me to strengthen my career in the protection of seas of the international community.
The International Tribunal for the Law of the Sea (ITLOS) specially to its current President Jose Luis Jesus and Judge Vladimir Golitsyn for his great support since he was the Director of UN/DOALOS/OLA. Along with Judges, Tullio Treves, Rüdiger Wolfrum, Dolliver Nelson and Hugo Caminos for their lectures and related knowledge regarding marine environmental protection during Rhodes Academy 2003. In the same organization to Mrs. Ximena Hinrichs and Mr. Louis Savadogo for the transfer of knowledge regarding law of the sea and marine genetic resources beyond waters of national jurisdiction.

The International Foundation for the Law of the Sea (IFLOS), to Mr. Joachim König, Director of the Summer Academy on Law of the Sea and to his wife Mrs. Doris König for their great support during the Academy 2009, which allowed to get fundamental understanding in specific topics for this dissertation.

The Lauterpacht Centre for International Law (LCIL) of University of Cambridge, specially to Dr. James Crawford and Dr. Daniel Bethlehem for his lectures on the legal framework of marine environment protection and scientific research during my internship in 2003.

My Parents Ruben and Helena for their daily prayers that contributed in a great manner to a peaceful life and concentration in the overall objectives while I was developing my MSc studies.
ABSTRACT

Title of Dissertation  Protecting Marine Biodiversity in the South Eastern Pacific

Degree   MSc

This dissertation is a study and review of the main concerns that affect the marine biodiversity in the South Eastern Pacific Ocean and analyse what might be done in order to increase protection of the coast/marine environment, living resources and their ecosystems.

The main idea is to promote a wider regional understanding and cooperation in the preservation and sustainable use of the marine environment and resources. The South Eastern Pacific Region (SEPR) consists of five countries that are referred in this work from the North to the South: Panama, Colombia, Ecuador, Peru and Chile.

In order to develop the dissertation in a consistent manner, an introduction presents a guide for the paper. Then, six chapters are proposed regarding ocean governance at the global and regional level, SEPR coastal/marine areas features, marine pollution prevention, sustainable fisheries, marine protected areas and marine genetic resources. In every chapter will be explained their major characteristics for the region and a summery with analysis on the central points. Finally, conclusions with recommendations focusing on specific points are set at the end.

The dissertation points out gradually some programmes developed by regional organizations like the South Eastern Permanent Pacific Commission (CPPS), the United Nations Environment Programme (UNEP), and the Inter-American Tropical Tuna Commission (IATTC), among others in the SEPR.

KEY WORDS: Marine Biodiversity, Marine Pollution, Living Marine Resources, Sustainable Fisheries, Marine Protected Areas, Marine Genetic Resources, South Eastern Pacific Region.
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<th>Description</th>
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<tr>
<td>AIDCP</td>
<td>Agreement on the International Dolphin Conservation Programme</td>
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<td>ARCCP/HOSCE/SEP</td>
<td>Agreement on Regional Cooperation in Combating Pollution by Hydrocarbons and other Substances in Cases of Emergency in the South East Pacific</td>
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<tr>
<td>BET</td>
<td>Big Eye Tuna</td>
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<td>BOD</td>
<td>Biochemical Oxygen Demand</td>
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<tr>
<td>BWC</td>
<td>International Convention for the Control and Management of Ships Ballast Water &amp; Sediments</td>
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<td>CBD</td>
<td>Convention on Biological Diversity</td>
</tr>
<tr>
<td>CHPC</td>
<td>Chilean Pacific Coast</td>
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<tr>
<td>CITES</td>
<td>Convention on International Trade in Endangered Species of Wild Fauna and Flora</td>
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<tr>
<td>CO/CPPS/CUCMR</td>
<td>Convention on the Organization of the Permanent Commission of the Conference on the Use and Conservation of the Marine Resources of the South Pacific</td>
</tr>
<tr>
<td>CODE/FAO</td>
<td>Code of Conduct for Responsible Fisheries</td>
</tr>
<tr>
<td>CONPACSE</td>
<td>Regional Coordinated Programme on the Research, Monitoring and Control of the Marine Pollution in the South East Pacific</td>
</tr>
<tr>
<td>COFI/FAO</td>
<td>FAO Committee on Fisheries</td>
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<tr>
<td>COPC</td>
<td>Colombian Pacific Coast</td>
</tr>
<tr>
<td>CP</td>
<td>Contracting Party</td>
</tr>
<tr>
<td>DEPI</td>
<td>Environmental Policy Implementation</td>
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<tr>
<td>DOALOS/OLA</td>
<td>Division for Ocean Affairs and the Law of the Sea of the Office of Legal Affairs of the United Nations</td>
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<tr>
<td>DOW</td>
<td>Direct Observations, Measurements, Identifications and/or Conclusions Made by the Writer on board of Bottom Trawling or Purse Seine Fishing Vessel</td>
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<td>EC</td>
<td>European Community</td>
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ECPC  Ecuadorian Pacific Coast
EEZ  Exclusive Economic Zone
EIA  Environmental Impact Assessment
ENSO  El Niño Southern Oscillation
EPO  Eastern Pacific Ocean
ETP  Eastern Tropical Pacific
FAD  Fish Aggregating Device
FAO  Food and Agriculture Organization of the United Nations
FAO/COFI  Food and Agriculture Organization of the United Nations, Committee on Fisheries
FC/SEP/UCMR  First Conference on the Use and Conservation of the Marine Resources of the South Pacific
FSA  Fish Stocks Agreement
GISP  Global Invasive Species Programme
GBWP  Global Ballast Water Management Programme
GSMS/TEP  Guidance on Sustainable Management of Sharks in the Tropical Eastern Pacific
GPA  Global Programme of Action
HCP  High Contracting Parties
HC/LME  Humboldt Current Large Marine Ecosystem
IAEA  International Atomic Energy Agency
IATTC  Inter-American Tropical Tuna Commission
ICGRFA  Intergovernmental Commission on Genetic Resources for Food and Agriculture
IHO  International Hydrographic Organization
IMO  International Maritime Organization
IOC  Oceanographic Governmental Commission
IPOA/Seabirds  International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries
IPOA/Sharks  International Plan of Action for the Conservation and Management of Sharks
IPOA/Capacity  International Plan of Action for the management of Fishing Capacity
<table>
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<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tr>
<td>IPOA/IUU</td>
<td>International Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing</td>
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<tr>
<td>IUCN</td>
<td>International Union for Conservation of Nature</td>
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<td>IUU</td>
<td>Unreported and Unregulated Fishing Vessels</td>
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<td>ISA</td>
<td>International Seabed Authority</td>
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<td>IWG/SICSUM/BWNJ</td>
<td>Ad Hoc Open-ended Informal Working Group to Study Issues relating to the Conservation and Sustainable use of Marine Biological Diversity beyond Areas of National Jurisdiction</td>
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<tr>
<td>LBSMP</td>
<td>Land based Source Marine Pollution</td>
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<td>LMR</td>
<td>Living Marine Resources</td>
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<tr>
<td>MBD</td>
<td>Marine Biodiversity</td>
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<tr>
<td>MGR</td>
<td>Marine Genetic Resources</td>
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<tr>
<td>MEPC</td>
<td>Marine Environment Protection Committee</td>
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<td>MPA</td>
<td>Marine Protected Areas</td>
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<td>MSR</td>
<td>Marine Scientific research</td>
</tr>
<tr>
<td>MTY</td>
<td>Million/Tonnes/Year</td>
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<tr>
<td>NCPs</td>
<td>National Contingency Plans</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<tr>
<td>NOZP</td>
<td>National Ocean and Coastal Zones Policy</td>
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<tr>
<td>NPOA</td>
<td>National Plan of Action</td>
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<tr>
<td>OLDEPESCA</td>
<td>Latin American Organization for Fisheries Development</td>
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<td>PAPC</td>
<td>Panamanian Pacific Coast</td>
</tr>
<tr>
<td>PEPC</td>
<td>Peruvian Pacific Coast</td>
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<tr>
<td>POA/SEP/PMECA</td>
<td>Plan of Action for the Protection of the Marine Environment and Coastal Areas of the South Eastern Pacific</td>
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<td>POPs</td>
<td>Persistent Organic Pollutants</td>
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<td>PP/SEP/PLBS</td>
<td>Protocol for the Protection of the South Eastern Pacific against Pollution from Land-Based Sources</td>
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<td>PSSA</td>
<td>Particularly Sensitive Sea Area</td>
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<td>RFBs</td>
<td>Regional Fishery Bodies</td>
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<td>RFMO</td>
<td>Regional Management Fisheries Organization</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>RPOA</td>
<td>Regional Plan of Action</td>
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<td>SAs</td>
<td>Special Areas</td>
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<td>SEPR</td>
<td>South Eastern Pacific Region</td>
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<td>SEP/CPMECZ</td>
<td>South Eastern Pacific Convention for the Protection of the Marine Environment and Coastal Zones</td>
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<td>SKJ</td>
<td>Skit Jack Tuna</td>
</tr>
<tr>
<td>SP</td>
<td>State Party</td>
</tr>
<tr>
<td>SPC</td>
<td>South Pacific Commission</td>
</tr>
<tr>
<td>SPRFMO</td>
<td>South Pacific Regional Fisheries Management Organization</td>
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<tr>
<td>TAC</td>
<td>Total Allowable Catch</td>
</tr>
<tr>
<td>TTY</td>
<td>Thousand/Tonnes/Year</td>
</tr>
<tr>
<td>UCW</td>
<td>Under Criteria of the Writer</td>
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<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
</tr>
<tr>
<td>UNGA/OLOS</td>
<td>United Nations General Assembly on Oceans and the Law of the Sea</td>
</tr>
<tr>
<td>UNICPOLOS</td>
<td>United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea</td>
</tr>
<tr>
<td>UNICPOLOS/MBWG</td>
<td>Ad Hoc Open/ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction</td>
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<tr>
<td>WMU</td>
<td>World Maritime University</td>
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<tr>
<td>YFT</td>
<td>Yellow Fin Tuna</td>
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INTRODUCTION

Firstly, this dissertation has been developed under the principle of good faith in order to encourage protection of marine biodiversity nationally and regionally in the South Eastern Pacific Region. Then, its content reflects my own personal ideas and views based on the application of the knowledge obtained during the MSc Programme in Maritime Affairs at the World Maritime University (WMU), field studies, previous formal studies, internships and training, and on my professional experience in both working on board fishing vessels and several national, regional and international organizations.

The dissertation commences by examining the international level inside the United Nations (UN) system and in particular its organizations of the International Maritime Organization (IMO), the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme (UNEP), the Intergovernmental Oceanographic Commission (IOC), as well as several Non-Governmental Organizations (NGOs) like the International Union for Conservation of Nature (IUCN), among others. As the paper progresses, global conventions and agreements regarding marine biodiversity protection are referred to, specifically regarding articles that support environmental topics at sea, while the regional level is also investigated.

Gradually, the paper focuses the South Eastern Pacific Region (SEPR) pointing out fields of interest for this study. At this stage, Regional Fisheries Bodies (RFBs) like the South Pacific Permanent Commission (CPPS), the Regional Seas Programme (RSP) for the SEPR and the Inter-American Tropical Tuna Commission (IATTC) along with a few more where their work in this part of Latin America supported by principles included in interconnected conventions and-or Plans of Action (POAs).
The SEPR consists of five countries that are central to this dissertation from the North to the South as follows: Panama, Colombia, Ecuador, Peru and Chile.

Regarding marine biodiversity protection, the starting point is the Convention on Biological Diversity (CDB, 1992), the aim of which is the conservation, sustainable use and fairly and equitably benefit sharing of biological diversity. In this regard, biological diversity has been defined as the variability amongst living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.\(^1\)

Harmonizing this definition, seabirds like pelicans, cormorants or frigatebirds are an important part of marine ecosystems. Furthermore, some species of albatrosses and larger petrels are very vulnerable to bycatching in long line fisheries and are becoming increasingly threatened with extinction. In this concern, it is estimated that tens of thousands of albatrosses are killed annually by pirate fishing vessels in the Southern Ocean.\(^2\)

On the other hand, the UNEP launched the Regional Seas Programme in 1974 based on the United Nations Conference on the Human Environment (UNCHE) held in Stockholm two years earlier. This programme was created to enhance sustainable management and use of the marine and coastal environment throughout of cooperation between states sharing a common body of water.

Consequently, the SEPR spans the entire length of the Pacific coast of South America from Panama to Cape Horn, which includes five states: Chile, Peru, Ecuador, Colombia and Panama, encompassing tropical, sub-tropical, temperate and Sub-Antarctic systems.\(^3\). Subsequently, these countries find themselves united by two huge natural phenomena.

\(^1\) See CBD. Article 2. 
\(^2\) See Global Seabirds Programme. Bird Life International.
\(^3\) See UNEP. Regional Seas Programme, South East Pacific.
Firstly, the Humboldt Current Large Marine Ecosystem (LME) which extends along the West Coast of South America from Northern Peru to the southern tip of Chile. This is dominated by the cold, nutrient-rich and largest upwelling system of deeper waters which support the world's most productive fishing grounds that includes three species of fish: anchoveta (*Engraulis ringens*), sardine (*Sardinops sagax*), and jurel (*Trachurus symmetricus*)\(^4\).

Additionally, the region is repeatedly interrupted by the El Niño Southern Oscillation (ENSO) as the result of a cyclic warming and cooling of the surface ocean in the central and eastern Pacific, producing dramatic upheavals in local, and eventually global climatic conditions\(^5\).

Taking into account the previous approach to the SEPR on the one hand, and a perceptible lack of an integrated transversal planning in the protection of marine biodiversity on the other, this dissertation moves towards the gaps in order to propose complementary programmes and recommendations. In the same manner, the dissertation is developed with the purpose of promoting a wider mutual and better understanding, and cooperation in the preservation and sustainable use of the marine biodiversity in the SEPR.

Consequently, the chapters in the dissertation refer to ocean governance at the global and regional level, SEPR coastal/marine areas features, marine pollution prevention, sustainable fisheries with an emphasis on National Plans of Action for the Conservation and Management of Sharks (NPOA/Sharks) for the region, marine protected areas and marine genetic resources. In every chapter their main characteristics are explained and concluding remarks focus on specific points. At the end of the paper, a conclusion is reached with some recommendations as it was proposed from the beginning.

Complementarily, the figures that illustrate some issues, particularly the protection of marine biodiversity in sustainable fisheries are mainly pictures that have been taken

\(^4\) See NOAA. *Large Marine Ecosystems of the World.*

\(^5\) See WMO. *El Niño Southern Oscillation* (ENSO).
directly by the writer during his work at sea regarding marine biodiversity protection in both the waters of national jurisdiction of the SEPR States or beyond in the high seas.

Finally for this introduction, the dissertation is an attempt to visualize in an integrated approach the problems that the SEPR has in protecting in a better manner the coastal/marine biodiversity; and proposed some short practical recommendations that might be useful for the marine environment and living resources in waters of national jurisdiction and beyond on the high seas.
CHAPTER 1 OCEAN GOVERNANCE

The coastal/marine environment is an essential reserve for life on earth. As a legacy, must be sheltered, preserved and correctly valued. The regional aim is to keep SEPR's coasts and oceans biologically safe, clean, vigorous and prosperous. On the top of that, ecosystems execute a quantity of key environmental roles. They normalize the climate, avoid erosion, collect and distribute solar energy, take carbon dioxide in, and perform a biological control. Then, coasts and oceans are our supreme foundation of biodiversity. They cover 71% of the Earth's surface and enclose 80% of the biosphere. The oceanic environment is in addition an immense supplier to economic growth, common well-being and quality of life. On the other hand, it is gradually facing more severe pressures. For instance, marine biodiversity is declining; habitats are being damaged, degraded and distressed. There is significant pollution from hazardous materials and climate change is having a shock on living marine resources.

At the UN level, one of the most important highlights in preserving the coastal/marine environment is the Stockholm Declaration which was approved during the Conference on the Human Environment held in 1972, which set out the essential doctrine and main aims of environmental policies, including oceans. In this concern, according to Principle 7, it is the duty of the nations worldwide to take all potential steps to avert contamination of the oceans.

Likewise, the UN Conference on Environment and Development (UNCED) in 1992, there was a broad-spectrum motivation throughout the global community to integrate

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6 See Marine environments and resources. p. 285.
new environmental management values into Agenda 21. Distinctively, the precautionary rule was encouraged through international coastal/marine environment management agreements.

The coastal/marine environment was also enclosed broadly at the Johannesburg Summit of 2002, a follow-up to UNCED. The Johannesburg Declaration on sustainable development definitely confirmed a State’s responsibilities with Agenda 21. It accepted an operating plan which includes a particular reference to coastal/ocean management safeguarding concerns considered as essential components of marine ecosystems and related global economies.

1.1 Regional Coastal/Marine Governance

The steady substantial and biological degradation of coastal/marine areas and the exhaustion of their resources, has been faster during the recent times at a worrisome pace. Although apparently local in nature, these problems are widespread and are today so evident at sites far away from their origin that only globally applied strategies have a chance to achieve long-term solutions. More accurately, the struggle of coastal/marine environment and ecosystems has considerable regional dissimilarities in their origins and degrees. Thus, the most valuable solutions should be found throughout actions on a local, national or with wider regional policies. The nature and intensity of restorative and preventative measures and strategies should be practically formulated and implemented in a region basis, taking into account that a solution at one area should not produce a trouble in another place. Therefore, regional cooperation is to be the most successful answer leading to realistic solutions for specific problems in a group of states with similar coastal/marine environment. For instance, the features shared in the SEPR in relation with the Humboldt Current Large Marine Ecosystem (HC/LME), which will be exposed further on in this dissertation.

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9 See Ocean Governance: Part III Regional level. The United Nations University.
1.2 South Eastern Pacific Regional Sea Programme

Concerned by particular marine environmental problems, the UNCHE served as a basis for launching the UNEP’s Regional Seas Programme (RSP) in 1974. The RSP seeks to control and reduce the degradation of coastal/marine areas worldwide with an appropriate sustainable management by encouraging and engaging states in the region with widespread and precise actions to protect their shared environment. Accordingly, the South Eastern Pacific Regional Sea Programme (SEP/RSP) was established for the neighbouring states of this region: Panama, Colombia, Ecuador, Peru and Chile, in 1982\(^\text{10}\).

In this regard, the South East Pacific Region (SEPR) extents the whole Pacific coast of South America from Panama to Cape Horn in Chile, encircling tropical, temperate and Sub-Antarctic systems. Besides the wide range of marine biodiversity expected, the countries mentioned share themselves two immense natural events. Firstly, the HC/LME dominating the nutrient-rich and cold marine waters in the region with the massive upwelling system, supports the most dynamic fishing stocks worldwide. Conversely, the SEPR is under warning from coastal/marine degradation by land-based and oceanic sources of pollution, among other dangers to the marine environment and ecosystems\(^\text{11}\).

The priorities for the SEP/RSP is determined on the full implementation of active official and lawful instruments carrying out transboundary marine pollution prevention throughout observation and overseeing programmes. In the same configuration, regional plans for the protection of endangered species such as sea mammals and turtles, along with activities to prevent introduction of foreign invasive species; and disseminate public education and awareness on the preservation of the marine biodiversity\(^\text{12}\).

\(^{10}\) See UNEP. *Regional Seas Programme. South Eastern Pacific.*

\(^{11}\) See UNEP. *South-East Pacific Region Profile.*

\(^{12}\) See Reef Relief (October, 2008). *A Blueprint for a Coastal and Ocean Policy for the New Administration.* p. 3.
Additionally, for the SEPR has been established the is routinely interrupted by the El Niño Southern Oscillation (ENSO) occurrence, which initiates in the equatorial Pacific, creating remarkable disturbances in local, regional and large-scale, climatic conditions. The ENSO affects all from the weather conditions to living marine resources causing vast social-economic impacts\(^{13}\).

Therefore, in order to develop a strategy to protect the marine environment there have been implemented several plans. On the top of them, the Plan of Action for the Protection of the Marine Environment and Coastal Areas of the South Eastern Pacific (POA/SEP/PMECA)\(^ {14}\) has been put into practice within the framework and cooperation of the UNEP, the CPPS and many other regional agencies and agreements.

### 1.3 Threats to the Marine Environment

Roughly worldwide models agree with the rise of surface warmth as greenhouse emissions continue gathering in the atmosphere. The possible consequences are far-reaching. The augmentation of acidification in the seawater would concern organisms whose shells and skeletons contain carbonate like coral reefs and certain kinds of plankton. The regulation of the carbon might also be destabilized.

Furthermore, the salinity of sea water will be reduced which will change air and sea water temperature and currents. The foreseen increase in sea level, as ice tops melt down, will possibly make it less salty and thick, hazarding a lot of species\(^ {15}\). And, non-original or modified species and diseases in foreign organisms are being unintentionally introduced to the SEPR by vessel hulls, anchors and discharge of ballast water and also through aquaculture.

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\(^{14}\) The POA/SEP/PMECA was approved in Lima, Peru on 12.11.1981.

As earlier mentioned, in order to minimize the origins on climate change, attempts are motivated by the 1997 Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) in 1994, aimed at the lessening of greenhouse gas absorption in the atmosphere. This will avoid dangerous human intervention with the climate system, and the consequences of hazards to the marine biodiversity, ecosystems and habitats.

Alternatively, over-fishing is a huge problem not only in the SEPR but also across the globe. Many populations of commercial fish classes are in a depleted status. A comprehensive fish stock appraisal are frequently supplied by RFMOs in the SEPR, particularly the IATTC, which indicates that the majority of the most valuable fish stocks of TFT, SKJ and BET have to be kept within safe biological limits. Over-fishing impacts a variety of non-target species as well as non-fish species like cetaceans. Commercial fishing also has a detrimental effect on susceptible habitats such deep-sea reefs, and modifies the configuration and functions of marine ecosystems.

Similarly, coastal activities in ports and harbours, urbanization of shore zones, tourism and sand and gravel removal are growing. Consequently, they are creating a shock to seashore habitats and their ecological sequences. The continuous change in marine streams and winds also has an impact on habitats and susceptible species. For instance, many areas in the SEPR’s shoreline are distressed by erosion and oceanic tides are reforming large coastal zones yearly.

In addition, from land based sources of pollution, eutrophication with nutrients such as nitrogen and phosphorus produced by crops growing and metropolitan sewage reach the seas augmenting seawater levels. Subsequently, these cycles increase the mass and range of algae and disturb the equilibrium of marine ecosystems and their courses. In the SEPR, programmes are being developed to diminish

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eutrophication but it is still a significant threat along numerous zones near to the most representative coasts in the region.

In the same approach, pollution made by harmful substances from industrial processes and domestic activities, discharge natural or man-made dangerous substances, which later locate in the oceanic environment. These liquid and solid materials might be toxic, persistent and accountable to bioaccumulate causing impaired biological courses in marine organisms. Furthermore, marine debris causes environmental, safety and economic struggles\textsuperscript{20}. Rubbish at sea arrives directly from vessels or from shores and watercourses.

From an equivalent perspective, regulations on the release of oil and other substances are recurrently ignored. Vessels clean their tanks and release their bilge water, creating persistent dispersed oil effluence that reaches seabirds, shellfish and other organisms on the shore of the SEPR. In favour of the protection of the marine environment, refineries tend to release less into sea reducing pollution considerably\textsuperscript{21}. Equally, shipping casualties have decreased by the protective measures for a safer maritime transport carried out by IMO, diminishing the hazard to the marine environment.

Finally, there are some kinds of pollution that have not been regulated like underwater noise which may harm life in coastal/marine areas. For instance, noise generated by maritime transport, oil and gas exploration and exploitation, dredging, building and military activities. These sounds are able to be heard over extremely long distances\textsuperscript{22}.

Concluding this chapter, it is observed that the elements for good ocean governance at the international level have been widely provided by the global institutions represented mostly by the United Nations agencies. These organizations like IMO,


\textsuperscript{22} See Ocean Noise: Turn it down (June 2008). \textit{A report on ocean noise pollution}. International Fund for Animal Welfare.
UNEP and FAO, among others have been working in the proposal of programmes to address the threats to the marine environment and living marine resources that were mentioned. At the regional level, organizations in the SEPR are very well structured although the communication of these with the international level should be strengthened, particularly in terms of getting updated feedback in the programmes and projects they run. With this would be guaranteed consistency in what is required for the protection of marine biodiversity in the SEPR.

At the national level, problems in implementing programmes regarding marine environment and protection of living marine resources are evident because of bureaucratic ladder in the government of States of the SEPR interrupt and delay processes in regard to the development of their national marine policies and reduce the possibility of getting desirable goals no only for their coasts and territorial seas but also in the integration of the policies into the regional level and their activities in waters beyond national jurisdiction.
CHAPTER 2 SEPR COASTAL/MARINE AREAS FEATURES

2.1 Coastal Geography

The Coast of SEPR consists of many peninsulas, gulfs and bays. There are broad intertidal zones and wide-developed barriers and lagoons along the coast. Small waterways release considerable quantities of water from fresh sources and suspend deposits during the wet period from May to September.

Figure 1: Map of the SEPR

The SEPR consists of five States which are from the north to the south: Panama, Colombia, Ecuador, Peru and Chile. These countries are mentioned in the dissertation in this geographical order23. (Source: Geographic Guide)

23 See Geographic Guide, Map of South America.
The continental shelves in the SEPR are slim; in some areas less than 10 km. Broader shelves are located off the Ecuadorian coastline, up to 27 km, and in the Gulf of Panama. The Panamanian Pacific Coast (PAPC) is created by the Gulf with waterway entrances, marshes and mangroves. Alongside the Darien Peninsula, marshes and mangrove swamps are predominant. The San Miguel Gulf, has many estuaries and splits the province into a slight northwest sector. Furthermore, Sea cliffs are partially developed by the side of the Panama shore.

The Colombia Pacific Coast (COPC) elongates 1,392 km, being high and hilly in the Northern part of Cape Corrientes. The southern part of the COPC is a plane with mangrove beaches and widespread estuaries shaped by the release of abundant waterways. Some islands are nearby the shoreline, some of those volcanic like Malpelo and Gorgona, and others are associated with the deltas of important rivers. The Ecuadorian Pacific Coast (ECPC) extends for 950 km with a sequence of irregular coves and capes being roughly cliffed in Santa Elena forming abundant terraces. Southwards, Guayaquil Gulf is a system with estuarine shoreline with thick mudflats and mangroves.

The Peruvian Pacific Coast (PEPC) is dry and runs for 3,080 km. This high aridity contributes with the rainy deposits and the expansion of beaches: just a few rivers constantly arrive at the sea, and others merely on a seasonal base. The seashore is cliffed and combined with short beaches and some water mouths. Pisco is a region with mainly cliffs or tiny embayment with slight beaches and rivers adding shore plains. Coastal displacement and platforms are evidenced.

The Chilean Pacific Coast (CHPC) has similar features to Peru’s, since the Andean series goes down to the ocean cliffed coasts with interrupted beaches or

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embayment where sporadic watercourses lead down to the coast. Numerous terraces appear along cliffed headlands fronting the foothills. As the coast comes to the south, it provides for only short embayment with prevailing beaches from Valparaíso to Chiloé. In Puerto Montt the coastal arrangement becomes wrecked being sturdily influenced by the consequences of glaciations with many islands and fiords.

2.2 Marine Ecosystems

The marine biodiversity contains in every ecosystem should by ethical principle to be preserved by every State in the SEPR. This is compilation of the main marine ecosystem in the region.

2.2.1 Coral Reefs

The SEPR is rich in coral reefs, mainly in Panama, Colombia and Ecuador. The fauna and flora in the region is similar, although the Galápagos Islands show a great variety of endemism. The colder water upwelling, predominantly in the Gulf of Panama, restrains reef development in this area.

The major coral zones are located in front of PAPC, where 21 species have been registered in the Southern part of Azuero Peninsula, and Coiba Island. In the same lane, reef formations reaches out COPC in Utría, Tebada, Gorgona and Malpelo Islands.

Moreover, some little coral developments are situated along the ECPC, like Machalilla and with a huge dimension around the Galápagos Islands which includes

See Encyclopedia Coastal Science (2005). Department Geology. Western Washington University. WA, USA.


13 documented hermatypic species and 32 a hermatypic species documented. Those hermatypic corals basically have west Pacific roots\textsuperscript{32}.

### 2.2.2 Mangrove Forests

The main species of plants along the SEPR coast are red (\textit{Rhizofora mangle} and \textit{R. harrisonii}), black (\textit{Avicennia germinans}, \textit{A. bicolour} and \textit{A. tonduzzi}), seed (\textit{Pelliciera rhizophorae} and \textit{Connocarpus erectus}) and white (\textit{Laguncularia racemosa}) mangroves, and cork oaks (\textit{Mora oleifera} and \textit{Mora megistosperma})\textsuperscript{33}. For instance, in the PAPC all these communities of mangroves prevail.

In the COPC and Northern part of ECPC, mangroves are sporadically interrupted by sandy beaches and dunes; reappearing in the Gulf of Guayaquil, where they become the largest community extending southwards to Tumbes in Peru\textsuperscript{34}.

### 2.2.3 Open Seas, Islands and Submarine Banks

The main upwelling takes place in and outside PAPC, being caused by seasonal winds coming from the Atlantic affecting superficial open waters. As a result, deeper and nutrient-rich water upwells. The upwell constantly happens off the PEPC and seasonally off the CHPC. The trench of Peru and Chile reclines near their coasts with a maximum depth of 8,000 metres. In this regard, the Panamanian Pacific sea involves Coiba, Otóque, and the Pearl Islands, the last is an archipelago with more than 180 smaller islets. While in the Colombian seas are encountered Malpelo and Gorgona islands, which were shaped by volcanoes, having both a unique flora and fauna in the SEPR\textsuperscript{35}.

The Galápagos Archipelago comprises 13 main islands and approximately 70 islets and rocks situated 800 nm off the ECPC. The majority are young and volcanic

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\textsuperscript{33} See D. J. Macintosh and E. C. Ashton (June 2002). A Review of Mangrove Biodiversity Conservation and Management. Centre for Tropical Ecosystems Research.


bordered with lava. Gradually, northwards 700 nm from this point, are located the San Felix and San Ambrosio islands. Finally, Puerto Montt and the island of Chiloé a wide rocky archipelago, lies southwards over 1,100 nautical miles.

2.2.4 Marine Biodiversity

The SEPR is rich in certain kinds of algae such as *Rodophycae*, *Phaeophytaea*, *Chlorophytae*, and the *macroalgae Cyanophytae*. From those, some species play a role for human consumption such as *Porphyra columbina*, *Ulva papenfussi* and *U. fasciata*, and others four for agar production like *Gracilariopsis lemanaeformis*, *Hypnea valentiae*, and *Agardhiella tenera*. Broadly, 234 species of *microalgae* including diatoms, dinoflagellates, coccolithoflorids and phytoflagellates are included in the list of flora for the region36.

The Benthos in the SEPR is represented by marine urchins like *Echinometra vanbrunti*, *Diadema maxicanum*, *Tripneustes depressus* and *Eucidaris thouarsii*: starfish such as *Nidorella armata*, *Leiaster callipeplus*, *Tamaria strae*, *Mitheodia bradlevyi*, *Ophicoma aethiops* and *Narcissia gracilis*. In Panamanian waters is found a richer marine biodiversity is found with more than 950 species of moluscs, 61 echinoderms, 400 crustaceans, 300 of marine worms, 11 of Chaetognatha, 52 of Foraminifera and 35 Cnidaria. Also, the basket starfish *Astrodictym panamense* thrives in the Colombian Malpelo Island37.

Additionally, 78 species of mollusc related with the coral *Quoyola monodonta* have been reported. Attached to the coral are certain porcelain snails such as *Cyprea. Cervinetta* C. *arabicula* and *C. robertsi* among others; and cones *Conus dalli* and *C. didam*). In Chilean waters the marine snail *Concholepas concholepas* and *Urchin Loxechinus albus* are found38.

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The Gulf of Panama is the area with the utmost marine biological productivity, since the continental shelf is wider with seasonal projection and a high number of drainage basins. The fish population in the SEPR consists mainly of anchovies (Cetengraulis mysticetus) and herring (Opisthonema libertate). The main predators linked with these species are Pacific sierras (Scomberomorus sierra), barracudas and sharks. High densities of shortfin scad (Decapterus macrosoma), sardines (Sardinops sagax) and jurel (Trachurus symmetricus) are also found in these sea waters.\(^{39}\)

In front of COPC, shallow water shrimps (Penaeus occidentalis, P. Stylirostris, P. vannamei stylirostris, P.brevirostris, Trachypenaeus birdi, Xiphopenaeus reveti, X. Kroyeri and X. Precipua) are harvested with economic significant for Ecuador and Chile as well. Also, certain species of deep water shrimp (Heterocarpus vicarius, Solenocera agassizii, Pleuroncodes planipes); some shellfish like scallops (Argopecten circularis), crabs (Hapalocarcinus marsupialis, Mithraz spinosissimus and Lithodes antartica), spiny lobster (Panulirus argus and P. Guttatus), rock lobster (Jasus frontalis) and different species of clams, oysters and mussels have economic importance.\(^{40}\)

Sea birds in the SEPR are represented by a large nesting settlement of boobies (Sula sp.), a couple of colonies of masked boobies (Sula dactylatra granti), and the red footed booby (Sula sula), all of these on the Colombian island of Malpeleo. In addition, a small nesting settlement of frigate birds (Fregata magnificiens) and some tropic birds (Pterodrama phaeopygea) are found. In Peru and Chile guano birds (Larus argentatus) have settled and some penguins (Spheniscus humboldti), in the south of the latter.\(^{41}\)

\(^{40}\) Ibid.  
\(^{41}\) See above n 10.
During the night a number of sea birds crash fly into themselves against any kind of vessels, including those covering transoceanic routes. Some survive and find protection on board while they recover. This is an impact on marine birds caused by shipping that has scarcely been perceived or studied. (Source: J. Plata Gonzalez)

Regarding marine mammals, approximately 60 species have been registered for the SEPR. The species of dolphins found in the region are bottlenose, striped dolphin, pan-tropical spotted, spinner, Irrawaddy, Frazer’s, Risso’s and dolphins. The dugong, a sea mammal registered for the region that is listed as susceptible to extinction by the World Conservation Union (IUCN) and the Chilean marine otters. Finally, the SEPR includes Blue, Minke, Sei, Bryde’s Humpback, Bryde’s and Sperm whales, among others\textsuperscript{42}.

2.3 Humboldt Current Large Marine Ecosystem

The Humboldt Current Large Marine Ecosystem (HC/LME) extends along the West Coast of South America from Northern Peru to the southern part of Chile. It has been recognized as one of the key upwelling arrangements worldwide, accountable for an exceptional amount of organic production. The HC/LME encloses cold waters with low salinity that stream into the route of the Equator and can extend more than

\textsuperscript{42} See Mammals of the Pacific (2009). The Pacific Wildlife Foundation.
500 nautical miles from the coastline\textsuperscript{43}. The HC/LME has been identified and classified as the most productive marine ecosystem in the world. The cold and highly nutrient waters taken to the surface by upwelling drives the system’s impressive productivity. These huge rates of primary and secondary production support the world’s largest fisheries\textsuperscript{44}.

\begin{figure}[h]
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\includegraphics[width=0.5\textwidth]{image}
\caption{Advantages of the HC/LME for local communities}
\end{figure}

An artisanal fishing boat for sharks off the Peruvian coast is an example of the HC/LME highest productivity that benefits local communities in the SEPR. (Source: J. Plata Gonzalez)

This circulation of nutrients takes place outside Peruvian shores during the entire year but in Chile solely during spring and summer, because of the movement of the subtropical centre of elevated pressure during the summer. In summary, roughly 18-20\% of the fish harvest globally comes from the HC/LME. Most of these species are pelagic, such as sardines, anchovies and jack mackerel, among others. In the same vein, the HC/LME high productivity links to other important marine resources along with marine mammals\textsuperscript{45}.

\textsuperscript{43} See UNEP/RSP (2006). \textit{Large Marine Ecosystems. Assessment and Management.}
Periodically, the upwelling that drives the system’s productivity is disrupted by El Niño Southern Oscillation (ENSO) phenomenon. When this occurs, fish quantities and allocation are drastically affected, often leading to populations collapses bringing social-economic shocks. Occasionally, this phenomenon leads to chronological alterations where sardines and anchovies substitute each other as the dominant species in the ecosystem. These changes have negative costs for the fishing industry and national economies on the countries that fish these pelagic species. Alternatively, overfishing in the HC/LME has caused a loss of biodiversity by pressuring and jeopardizing marine otters, lions, some whales and birds. An ENSO event united with overfishing is able to exhaust a fishery, as occurred in 1972 when the anchovy fishery collapsed46.

As a response to continue protecting these fish stocks, Peru and Chile, the countries bordering the HC/LME, have agreed on regional cooperation for the assessment of sardine and anchovy in the area they share. The relevant work in this concern has been carried out by the Chilean Fisheries Research and Development Institute (INOF) and the Peruvian Marine Research Institute (IMARPE) involving related stakeholders and administrators from both countries. Increasingly, the two nations have become aware of some of the threats and issues associated with the management of the LME. In the last few years, there has been an augmented need to better understand the biophysical, social-economic and political factors impacting this LME, to develop national and regional institutional capacity and to harmonize marine policies and legislation47.

2.4 Transboundary and Migratory Fish Stocks in the SEPR

The SEPR nations have interest in a number of species classified as migratory fish stocks. Some of these should be managed strictly within the region, while others should be regulated by wider-covered RFBs, such as the Inter/American Tropical Tuna Commission (IATTC) or the South Pacific Regional Management Organization.


47 See the Chilean Fisheries Research and Development Institute.
(SPRFMO), whose jurisdiction has been place beyond the SEPR. For instance, tuna fishing activities in the Eastern Pacific Ocean (EPO) are regulated by IATTC48.

Similarly, there are pelagic resources shared by two or more coastal states in the SEPR, like Sardine (Sardinops sagax), Anchovy (Engraulis ringens), Jack Mackerel (Trachurus picturatus), and gigantic squid (Dosidicus gigas). Additionally, a few of the resources such swordfish (Xiphias gladius) extend into the high seas, bordering the EEZs of coastal states49.

In the SEPR, the current conditions of small pelagic fisheries, these stocks are supervised on a state by state basis. According to fisheries domestic laws, the primary goal is to secure a rational utilization of the marine living resources to optimize the benefits from the fisheries, along with the preservation of the environment and biodiversity. The regulations specified in these laws are referred to as total allowable catch (TAC), limitations on fleet capacity, fishing and closed periods, smallest size permitted, banned or reserve areas, correct fishing methods, fishing gears systems. Furthermore, the regulations stipulate the indispensable observation, administration and inspection procedures 50. In addition, the requirements adopted by SEPR States in relation with conservation and the balanced use of marine resources are applied beyond the 200 NM margin.

Summarizing this chapter, it has been verified the great and rich marine biodiversity in the SEPR represented by their living resources located along coasts, territorial waters and in the high seas. They are important not only for the region but also for the rest of the world, since the productivity of the Humboldt Current itself provides a big amount of protein that would be very difficult to be obtained on land. Therefore, all the efforts should be made in the preservation and sustainable use of these ecosystems that assure their benefits for present and future generations worldwide.

48 The IATTC was established by international convention in 1950.
49 Swordfish (Xiphias gladius) is the only species from this group that is considered HMS.
50 See SPC Oceanic Fisheries Programme.
CHAPTER 3 MARINE POLLUTION PREVENTION

First and foremost, the United Nations Convention on the Law of the Sea (UNCLOS) is recognized to be an “umbrella convention” for the reason that most of its stipulations can be put into operation only through specific operational regulations in other specialized conventions. Respectively, the Division for Ocean Affairs and the Law of the Sea of the Office of Legal Affairs (DOALOS/OLA) of the UN serves as the secretariat of the UNCLOS and provides information, advice and assistance to States with a view to providing a better understanding of the Convention of the Law of the Sea and the related Agreements, their wider acceptance, uniform and consistent application and effective implementation.

Prior to UNCLOS, the International Maritime Organization (IMO) was adopted by the United Nations Maritime Conference in Geneva in 1948. The main task of IMO has been to develop and maintain a comprehensive regulatory framework for shipping including safety, security and environmental concerns, legal matters, technical cooperation and efficiency of shipping, as it is mentioned by the Convention on the Law of the Sea.

Linking these two conventions, it is observed that IMO is clearly mentioned in UNCLOS in Annex VIII Special Arbitration, exclusively in its Article 2, where some provisions of the Convention on the Law of the Sea refer to a competent international organization in relation to the acceptance of international shipping.

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53 See IMO Convention. Article 1 establishes the global scope of IMO on anti/pollution activities; Article 59 mentions IMO as the specialized agency within the UN system in relation to shipping and marine environment. Articles 60, 61 and 62 state cooperation between IMO and other specialized agencies and NGOs.
regulations and principles in subjects regarding maritime safety and prevention and control of marine pollution from vessels and by dumping, within others topics.

In such a case the expression "competent international organization" applies exclusively to IMO as a specialized agency within the UN system. As many provisions in UNCLOS refer to the mandate of several organizations in connection with the same subject matter, DOALOS/OLA published in the Law of the Sea Bulletin No.31, a table on “Competent or relevant international organizations” in relation to UNCLOS 54.

3.1 Ship Source Marine Pollution

On the subject of marine pollution prevention, UNCLOS in Article 39 concerning the duties of ships in transit passage 55 and Article 94 which normalizes the duties of flag States 56, requires both to observe the applicable international regulations, procedures and practices concerning the prevention, reduction and control of marine pollution, among other obligations. Concretely for Vessel Source Marine Pollution, UNCLOS has referred in Article 210 to pollution by dumping, in Article 211 pollution from vessels, and in Article 212 pollution from or through the atmosphere 57.

In IMO, the Marine Environment Protection Committee (MEPC) is the senior technical body on marine pollution related matters. It is aided in its work by a number of subcommittees. Correspondingly, the most important convention regulating and preventing marine pollution by ships is the IMO International Convention for the Prevention of Pollution from Ships, 1973, as modified by the

55 Specifically UNCLOS: Article 39 Duties of ships and aircraft during transit passage 2. Ships in transit passage shall: (b) comply with generally accepted international regulations, procedures and practices for the prevention, reduction and control of pollution from ships.
56 Specifically UNCLOS. Article 94 Duties of the flag State 4. Such measures shall include those necessary to ensure: (c) that the master, officers and, to the extent appropriate, the crew are fully conversant with and required to observe the applicable international regulations concerning the safety of life at sea, the prevention of collisions, the prevention, reduction and control of marine pollution, and the maintenance of communications by radio.
Protocol of 1978 (MARPOL 73/78). This covers accidental and operational oil pollution as well as pollution by chemicals, goods in packaged form, sewage, garbage and air pollution.

### 3.1.1 Convention for the Protection of the Marine Environment and Coastal Zones

Intrinsically, pollution has been defined in Article 2 “Definitions” of the South Eastern Pacific Convention for the Protection of the Marine Environment and Coastal Zones (SEP/CPMECZ) as it was stated in Article 1 “Use of terms and scope” of UNCLOS, one year later\(^{58}\).

<table>
<thead>
<tr>
<th>IMO</th>
<th>Panama</th>
<th>Colombia</th>
<th>Ecuador</th>
<th>Peru</th>
<th>Chile</th>
</tr>
</thead>
</table>

**Table 1: Year of Ratifications of SEPR States to the IMO\(^{59}\)**

(Source: IMO Website)

On the same basis, for activities taking place at sea like vessel-source pollution, dumping, offshore seabed activities, deep seabed mining\(^{60}\), international rules stand for minimum standards. Funnelling this requirement up, national laws and regulations must be as effective as international systems, without qualification. In addition, for pollution that originates from actions within national territory, land-based

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\(^{58}\) Specifically UNCLOS: Article 1 Use of terms and scope. (4) "pollution of the marine environment" means the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities;

\(^{59}\) See IMO Website.

\(^{60}\) Specifically UNCLOS: Articles 208, 209, 210 and 211
sources and atmosphere, national rules must only take into consideration international rules and standards.

In a broad sense, the measures taken up by every single State must rely entirely on the best practicable means, in accordance with its capabilities. Evidently, these qualifications include the presumption that not all nations will be in a position to adjust their domestic development activities right away. Concurrently, they do not weaken particular duties acquired by States in any bilateral, regional or global convention relating to the protection of the marine environment. Consequently at the regional level, the SEP/CPMECZ Convention was ratified by Panama, Colombia, Ecuador, Peru and Chile within the same decade.

Accordingly, the contracting parties of the SEP/CPMECZ Convention agreed on adopting appropriate measures to prevent, reduce and control the marine and coastal zones pollution; and ceaselessly work in the sustainable exploitation of natural resources in the SEPR. Additionally, the five States have concurred to diminish of all kinds of pollution and sources, meanwhile promoting an adequate marine environment management in the region.

Regionally, the SEP/CPMECZ urges its member States cooperation in emergencies of imminent danger or risk of pollution that jeopardize the marine and coastal zones environment in the SEPR. For these purposes, assistance by experts, equipment and required materials will be supplied by its Executive Secretary, on the South Pacific Permanent Commission (SPPC), as support to this Convention.

Concurrently, the Plan of Action for the Protection of the Marine Environment and Coastal Areas of the South Eastern Pacific (POA/SEP/PMECA) was approved. Absolutely, both the SEP/CPMECZ and POA/SEP/PMECA represent the

61 Specifically UNCLOS: Articles 207 and 212
63 The SEP/CPMECZ was signed in Lima, Peru on 12.11.1981, and entered into force on 19.05.1981.
fundamental principles for a productive, abundant and successful regional cooperation among Panama, Colombia, Ecuador, Peru and Chile, in order to protect and preserve the coastal zone and marine environment with all means. Evidently, these two documents particularly agree along with Part XII Protection and Preservation of the Marine Environment with Article 194 Measures to Prevent, Reduce and Control Pollution of the Marine Environment of UNCLOS.

As it is observed, the POA/SEP/PMECA in its essential interpretation offers equivalent features to those included in the Regional Seas Programme developed by UNEP. Therefore, the regional coordination of this RPOA has been assigned to the South Eastern Permanent Commission (CPPS) as the most appropriate body in the SEPR.

The legal Framework of the POA/SEP/PMECA is imbedded in the SEP/CPMECZ urging contracting parties to make cooperating individual, bilateral or multilateral efforts for adopting suitable measures for preventing, reducing and controlling the marine and coastal zones pollution in the SPR. Consequently, the regional mechanisms mentioned will promote health and wealth in the coastal communities alongside the South Pacific shoreline.

Subsequently, strategies derived from them will contribute in assuring the conservation and sustainable exploitation of their living marine resources for Latin American contemporary and future generations, according to the basis exposed in Part XII Protection and Preservation of the Marine Environment, particularly in Article 197 Cooperation on a global or regional basis of UNCLOS.

Pollution from vessels has been defined as “the discharge of wastes or other matter incidental or derived from the normal operation of ships, as well as pollution resulting from ship accidents”\(^{64}\). Article 211 “Pollution from vessels” of UNCLOS exposes how States throughout competent global organizations shall ascertain international rules and standards to prevent, reduce and control pollution of the

marine environment and designed systems to minimize the threat of accidents that could cause marine and coastline pollution\textsuperscript{65}.

<table>
<thead>
<tr>
<th>MARPOL 73/79</th>
<th>SEPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annex II: Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk (April 1987)</td>
<td>Panama, Colombia, Ecuador, Peru, Chile</td>
</tr>
<tr>
<td>Annex III: Regulations for the Prevention of Pollution by Harmful Substances Carried at Sea in Packaged Form (July 1992)</td>
<td>Panama, Colombia, Ecuador, Peru, Chile</td>
</tr>
<tr>
<td>Annex IV: Regulations for the Prevention of Pollution by Sewage from Ships (September 2003)</td>
<td>Panama, Colombia, Ecuador, Peru, Chile</td>
</tr>
<tr>
<td>Annex V: Regulations for the Control of Pollution by Garbage from Ships (December 1998)</td>
<td>Panama, Colombia, Ecuador, Peru, Chile</td>
</tr>
<tr>
<td>Annex VI: Regulations for the Prevention of Air Pollution from Ships (May 2005)</td>
<td>Panama, Ecuador, Chile</td>
</tr>
</tbody>
</table>

Table 2: SEPR States that have ratified the different MARPOL Annexes
(Source: IMO Website)

As a complement, it has been recognized that pollution from vessels cannot be managed effectively without the participation of flag States. They have the major responsibility for certifying that the vessels which fly their flags comply with all pertinent global rules and standards relating to vessel source pollution\textsuperscript{66}.

\textsuperscript{65} Specifically UNCLOS: PART XII Protection and Preservation of the Marine Environment Article 211 Pollution from vessels. Paragraphs 4 and 5, in relation with sovereignty of Coastal States in their Territorial Sea and in their EEZ; and Article 218 Enforcement by port States: Paragraphs 3 and 4.

3.1.2 Agreement in Combating Pollutions by Hydrocarbons and Other Harmful Substances in Cases of Emergency in the South East Pacific

Simultaneously with the Convention for the Protection of the Marine Environment and Coastal Zones (SEP/CPMECZ, 1981), the Agreement on Regional Cooperation in Combating Pollution by Hydrocarbons and other Substances in Cases of Emergency in the South East Pacific (ARCCP/HOSCE/SEP) was signed by the same countries\textsuperscript{67}.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{whale.png}
\caption{Effects of Marine Pollution in Marine Mammals Longevity}
\end{figure}

An adult sperm male whale, \textit{(Physeter macrocephalus)}, found dead just a few miles from the Panama Canal. Fishermen of tuna fishing vessels in the SEPR usually try to take pieces of inert marine mammal to be used later as part of Fish Aggregating Devices (FAD) one of CODE/FAO the restricted fishing methods for the big amount of bycatch including sharks that these produce. (Source: J. Plata Gonzalez)

\textsuperscript{67} The ARCCP/SEP/HOSCE was signed in Lima, Peru on 12.11.1981, and entered into force on 13.07.1986.
The ARCCP/HOSCE/SEP objective is the coastal States and marine ecosystems protection against pollution of the South Eastern Pacific by oil and other destructive matters in cases of emergency. According to the agreement, the States Parties assume to unite their efforts in taking the required instruments to counteract and address controls on the damaging effects when the marine environment is endangered. Moreover, State Parties agreed in preserving and encouraging their contingency plans and agendas intended at struggling marine pollution by oil and other harmful substances, carrying out hold overseeing actions in salvaging harmful substances and swapping over information concerning their competent nationwide authorities for combating pollution, support programmes or processes to combat pollution and the development of interrelated study programmes.

3.1.3 Supplementary Protocol to the Agreement on Regional Cooperation in Combating Pollutions by Hydrocarbons and Other Harmful Substances in the South East Pacific

The Supplementary Protocol to the Agreement on Regional Cooperation in Combating Pollutions by Hydrocarbons and Other Harmful Substances in the South East Pacific (CP/ARCCP/HOS/SEP), under the same objective of the ARCCP/HOSCE/SEP, agrees to designate competent national authorities by the States Parties of ARCCP/HOSCE/SEP to supply or demand assistance in case of emergency and to assume a register of the available technical equipment and procedures to combat pollution, as those are stipulated elements of the National Contingency Plans (NCPs), including carrying out standard training programmes.

3.1.4 Regional Coordinated Programme for Research, Surveillance and Control of Marine Pollution in the South Eastern Pacific (CONPACSE)

Gradually, the SEP/CPMECZ and the SEP/POA/PMECZ have been supporting the establishment of regional strategies for implementing relevant measures for

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68 Specifically ARCCP/SEP/HOSCE (1981): Article I, Article IV, Article V, Article VI, Article VII and Article IX.

69 The CP/ARCCP/HOS/SEP was signed in Quito, Ecuador on 12.11.1983, and entered into force on 20.05.1987.

70 Specifically CP/ARCCP/HOS/SEP (1983): Article I and those on NCPs.
preventing, reducing and controlling the marine and coastal zone pollution in the SEPR. In this connection, the Regional Coordinated Programme on the Research, Monitoring and Control of the Marine Pollution in the South East Pacific (CONPACSE) was created in 2000, involving a continuous interaction with international organizations, such as UNEP, OIC, WHO and IMO with the support of researching institutions in SEPR countries.

<table>
<thead>
<tr>
<th>IMO Marine Environmental Conventions</th>
<th>Ratifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972</td>
<td>Panama, Peru and Chile</td>
</tr>
<tr>
<td>International Convention on Civil Liability for Oil Pollution Damage (CLC), 1969</td>
<td>Panama, Colombia, Ecuador, Peru and Chile</td>
</tr>
<tr>
<td>Protocol of 1992 to amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage</td>
<td>Panama, Colombia, Ecuador, Peru and Chile</td>
</tr>
</tbody>
</table>

Table 3: Other IMO Marine Environmental Conventions ratified by some SEPR States
(Source: IMO Website)

On a broader base, the CONPACSE itself has substantially: (a) fulfilled the lack of knowledge on the marine environment in the SEPR; (b) improved national competencies in surveillance and control of marine pollution; (c) strengthened of technical and scientific basis for national and regional projects on marine pollution control. As a complement to assist this multilateral programme, its Regional
Technical Committee (RTC/CONPACSE)\textsuperscript{71} has been recently constituted involving the following institutions as National Focal Points (NFPs).

For instance, the Research and Development General Division of the Panamanian Aquatic Resources Authority (Panamá), the Marine Environment Protection Division of the Pacific Pollution Control Centre (Colombia), the Oceanographic Research Department of the Ecuadorian Navy’s Oceanographic Institute (Ecuador), the Coastal, Development and Control Unity of the Peruvian Marine Institute (Peru); the Department for the Preservation of the Aquatic Environment and Pollution Reduction (Chile).

On a biannual basis, the activities of the RTC/CONPACSE are regarding to the appraisal, verification, unification and adoption of protocols, procedures and standardized methodologies on behalf of National Working Groups (NWG), the assessment and implementation of analytical methods for the analysis of Polycyclic Aromatic Hydrocarbons (PAHs), the regional cooperation strengthening training and capacity building in protocols, procedures and standardized analytical techniques, and the studies on the subject of the grade of marine pollution by hydrocarbons, heavy metals, marine waste, POPs and radioactivity, among others.

3.2 Invasive Alien Species

Invasive alien species (IAS) are organisms that have been introduced and spread outside their natural origin threaten marine biodiversity. IAS takes place in different groups of plants, fish, crustaceans and other microorganisms affecting all kinds of ecosystems. The introduction of foreign species is frequently made shipping and trade. If the new habitat for an organism is adequate enough it will stay alive and duplicate. Nonetheless, it will survive in a lower number if there are many mates to multiply themselves.

\textsuperscript{71} The RTC/CONPACSE was created during a meeting held for that purpose in Panama (Panama) from 30.07.2008 to 31.07.2008.
A number of species have managed to be invasive in a new environment affecting and harming marine ecosystems. Some of the frequent features of IAS comprise fast duplication and growth, elevated dispersion capacity, and skills to survive in a large variety of marine environmental circumstances. Marine ecosystems that have affected by foreign organisms might not have expected predators anymore and competitors present in their surroundings would probably alter the normal conditions of living.

3.2.1 Global Invasive Programme

The Global Invasive Species Programme (GISP) is a global scheme to tackle worldwide the hazard of non-native species. The GISP was proposed during the first conference on IAS carried out in Trondheim, Norway in 1996. GISP’s assignment is to preserve marine biodiversity and maintain ecosystems by reducing the spread and impact of alien organisms.

GISP supplies the basis for the implementation of Article 8 (h) of the CBD and has provided the facts and alertness of foreign throughout the different proposals and publications such as the Global Strategy on IAS (GSIAS). A special GISP Secretariat was created in 2003 and located in Nairobi (Kenya) to make possible the implementation of the GSIAS in 2005.

The introduction of invasive marine species (IMS) into new coastal/marine environments ballast waters carried by vessels or their hulls and by other vectors has been become aware of as one of the utmost threats to oceans worldwide. Those along with land/based sources of marine pollution, unsustainable exploitation of LMR and substantial affection of their surroundings.

3.2.2 Global Ballast Pollution

In this respect, ships transport more than 85% of the world’s goods transferring concerning roughly five billion tonnes of ballast water globally every year. A comparable quantity is moved internally within states each year. Ballast water is
entirely indispensable to secure the effective performance of shipping at present, given stability and balance to vessels, though those waters cause a severe environmental and socio-economic threat.

3.3 Marine Pollution by Dumping

From the outset, dumping has been defined by UNCLOS, Article 1 “Use of terms and scope” as “any deliberate disposal of wastes or other matter from vessels”\(^72\) and distinguished in the same article from any other kinds of disposals rather than “the disposal of wastes or other matter incidental to, or derived from the normal operations of vessels, aircraft, platforms or other man-made structures at sea and their equipment, other than wastes or other matter transported by or to vessels…”\(^73\)

On the same line, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (London Convention) has been one of the earliest worldwide conventions to protect the marine environment from human activities, since it has been in force for more than 34 years now. Its main objective is to encourage the effective management and handling of all sources of marine pollution and to take all feasible steps to avert contamination of the oceans by discarding wastes and other materials.

In 1996, the London Protocol to the London Convention was adopted\(^74\) subject to ratification. This agreed to update the Convention and, finally, replace it. Under the Protocol all dumping is banned, except for possibly tolerable wastes on the so called

\(^{72}\) Specifically UNCLOS: Article 1 Use of terms and scope. (5) (a) "dumping" means: (i) any deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other man/made structures at sea; (ii) any deliberate disposal of vessels, aircraft, platforms or other man/made structures at sea.

\(^{73}\) Specifically UNCLOS: Article 1 Use of terms and scope. (5) (b) "dumping" does not include: (i) the disposal of wastes or other matter incidental to, or derived from the normal operations of vessels, aircraft, platforms or other man/made structures at sea and their equipment, other than wastes or other matter transported by or to vessels, aircraft, platforms or other man/made structures at sea, operating for the purpose of disposal of such matter or derived from the treatment of such wastes or other matter on such vessels, aircraft, platforms or structures; (ii) placement of matter for a purpose other than the mere disposal thereof, provided that such placement is not contrary to the aims of this Convention.

"reverse list". In line with UNCED's Agenda 21, the London Protocol highlights the global tendency towards preventative measures and prevention with the Parties agreeing to move from controlled spreading at sea of a variety of land-generated litter and debris towards integrated land-based solutions.

Complementarily, the reverse list includes dredged matter; sewage slush; industrial fish processing residues; man-made structures at sea; inert physical material; organic substances of natural source; and bulky items including iron, steel, concrete and similar materials, among others. In addition, the London Protocol makes illegal the practice of burning at sea, except for urgent situations, and bans the exports of wastes or other matter to non-Parties for the purpose of dumping or incinerating at sea.

At present, 85 States party to the London Convention. The Protocol of the London Convention entered into force on 24 March 2006 and currently there are 36 States party to it. Regionally in the SEPR, the London Convention has been ratified by Panama, Peru and Chile.

3.4 Marine Pollution from Land-Based Sources

Considerably, the greatest sources of marine pollution are based on land. As much as 80% of the pollution load in coastal areas and the high seas originates from land-based actions. This includes public, industrial and farming residues and overflow, as well as the atmospheric accumulation of pollutants from power generation, heavy industry and vehicles. Contaminants include heavy metals and POPs, waste, hydrocarbons and chemical materials. For both pollution mitigation purposes and the conservation of marine biodiversity it is critical that international attempts to deal with land based sources of marine pollution must be accelerated. Additionally,

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76 See UNEP. The Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities.
major efforts at the regional and domestic levels should be made in an integrated approach.

The Convention for the Prevention of Marine Pollution from Land-Based Sources (CP/MP/LBS)\(^77\) defines “pollution from land-based sources” as the “pollution of the coastal/marine area through watercourses, from the shore, as well as inclusion throughout submarine or other pipelines to the sea, and by emissions into the atmosphere”.\(^78\) The CP/MP/LBS urges SPs to put into operation programmes and procedures to eradicate pollution of the coastal/marine area from land-based sources by substances catalogued in Part I of Annex A\(^79\) (b) for the diminution or, as suitable, removal of contamination of the maritime area from land-based basis by liquid materials listed in Part II of Annex A. These substances shall be released only after consent has been approved by the proper authorities within each Contracting State\(^80\).

As stated in the CP/MP/LBS and Protocol of 1986, both mutual instruments recognize that combined cooperation and action is fundamental at the national, regional and subregional level to struggle with marine pollution, because of the common interests of states with the same maritime area.

During the same decade, UNEP in 1982 initiated developing advice to Governments on reducing impacts of the marine environment from land-based actions. This initiative led to the preparation of the Montreal Guidelines for the Protection of the Marine Environment against Pollution from Land-based Sources in 1985. The CPPS, took into consideration the urgency and importance of the reduction on marine pollution from land-based sources, encourages States at the SEPR to work together in the implementation of coordinated programmes.

\(^77\) The CP/MP/LBS was done at Paris on 04.06.1974; and amended by a Protocol on 26.03.1986.
\(^78\) See CP/MP/LBS: Article 3 (c).
\(^79\) See CP/MP/LBS: Annex A, Part I (iii) lists the following substances: organohalogen compounds and substances which may form such compounds in the marine environment; 2. mercury and mercury compounds; 3. cadmium and cadmium compounds; 4. persistent synthetic materials; 5. persistent oils and hydrocarbons of petroleum origin.
\(^80\) See CP/MP/LBS: Articles 4, 1 and 2.
The protection of the marine environment from land-based activities was placed directly under the perspective of sustainable development by the United Nations Conference on Environment and Development in 1992. States basically agreed to apply protective, precautionary, and preventative approaches to the degradation of the marine environment, as well as to minimize the risk of long-term or irretrievable undesirable effects on it; to ensure previous appraisals of activities that may have considerable unfavourable impacts on the marine environment; and within others, to incorporate protection of the marine environment into appropriate general environmental, social and economic development policies and strategies.

Moreover, Agenda 21 connected the accomplishment of these obligations with action to reach objectives in integrated management and sustainable development of the marine environment, including coastal areas under national jurisdiction.

As a result, the Global Programme of Action (GPA), therefore, was proposed to be a foundation of conceptual and practical guidelines to be drawn upon by national and regional authorities in setting up and implementing prolonged actions to prevent, reduce, control and eradicate marine degradation from land-based activities. Effective implementation of this GPA is a critical and indispensable step forward in the protection of the marine environment and will encourage the aims and goals of sustainable development.\(^1\)

### 3.4.1 Protocol for the Protection of the South Eastern Pacific against Pollution from Land-Based Sources

The Protocol for the Protection of the SEPR against Pollution from Land-Based Sources (PP/SEP/PLBS)\(^2\) was signed in mid 1983 and ratified by Chile, Colombia, Ecuador, Panama and Peru, during the same decade. The area of competence was defined within the sovereign waters of the contracting parties in the SEPR from respective straight baselines to 200 nautical miles, including internal waters to the

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\(^1\) See UNEP. Global Programme of Action for the Protection of the Marine Environment from Land/Based Activities. Legal and institutional framework and Global Programme of Action.

\(^2\) The PP/SEP/PLBS was adopted in Quito, Ecuador on 22.07.1983; and entered into force in 1986.
border of rivers and other fresh waters bodies. Then, as stipulated by international agreements in this concern, marine pollution from land-based sources embraces in this Protocol: (a) coastal outfalls, disposal and discharges; (b) discharges through rivers, canals and other watercourses; and (c) any other land-based source situated within the territories of the HCP, as a whole.

By common consent, the HCP agreed to work hard, either by itself or through cooperation, in adopting appropriate measures to prevent, reduce and control pollution of the marine environment from land-based sources, reducing such harmful effects to human wellbeing and marine life. For these purposes, the HPC shall adopt pertinent and appropriate laws and regulations harmonizing their domestic policies at the regional level.

3.4.1.1 Pollution by household sewage in the SEPR

To facilitate the understanding of land-based pollution that will be exposed in this part of the dissertation, it is important to explain that there are three types of wastewater, or sewage: household sewage, sewage sludge, and storm sewage. The household sewage carries water employed from houses, known as sanitary sewage, as well. Industrial sewage is utilized water from manufacturing or chemical processes. Storm sewage, is the overflow from rain that is collected in a system of pipes or open canals. Complementing, BOD5 stands for the five-day Biochemical Oxygen Demand, which is the amount of oxygen required by aerobic bacteria to decompose organic substances in a water sample.

In the PAPC, the principal source of domestic sewage is located in the Metropolitan Region and Panama City, whose sewage is disposed of at sea without any treatment into Panama Bay, reaching 78.2 Million/Tonnes/Year (MTY) that cause a discharge of organic contaminants of 50.55 Thousand/Tonnes/Year (TTY/BOD5).

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83 See PP/SEP/PLBS: Article I Area of Application, Article II Sources of Pollution and Article III General Obligations.
84 See PP/SEP/PLBS: Article II Sources of Pollution.
85 See PP/SEP/PLBS: Article III General Obligations.
86 See POA/SEP/PMECA Report. Plan of Action for the Protection of the Marine Environment and
In the COPC, approximately 52 MTY of household sewage is annually released into the ocean. In the same process, industrial sewage is produced with a high load of organic contaminants up to 7.28 TTY/BOD5. Interdependently, Buenaventura and Tumaco harbours discharge together 25 MTY with organic contaminants up to 4.72 TTY/BOD5. This amount represents 64.8% from the total of the discharge in the CPC. From other minor points, 26.9 MTY of sewage sludge containing 2.56 TTY/BOD5 arrives to the CPC. Buenaventura merely generates 3.97 TTY/BOD5, which is roughly 54.2% and Tumaco 0.74 TTY/BOD5\(^87\).

In the EPC, the amount of household sewage released directly to shore is nearly 128.4 MTY, which means organic pollutants up to 48.28 TTY/BOD5. The largest disposal at sea is produced by the Province of Guayas generating 30.16 TTY/BOD5 equivalent to 62.5% of the entire littoral. The main city contributing to this quantity is Guayaquil disposing of 18.9 TTY/BOD5. The remaining discharges come from the Province of Manabi with 10.13 TTY/BOD5; the province of El Oro with 5.02 TTY/BOD5; and the province of Esmeraldas with 2.98 TTY/BOD5\(^88\).

In the PEPC, 72.2% of the total domestic sewage is disposed of at sea in Callao y Miraflores bays. The full amount of household discharges at sea reaches 418.75 MTY with an associated organic material of 123.9 TTY/BOD5. From this overall sum, Lima y Callao releases 330 MTY with 89.5 TTY/BOD5. Other smaller cities, such as Trujillo and Chimbote contribute to the land-based marine pollution with approximately 40.6 MTY and 13.2 MTY, and, 10.96 TTY/BOD5 and 3.92 TTY/BOD5, respectively\(^89\).

In the CHPC, the disposal of household sewage into the ocean is roughly 672.4 MTY, representing 166.9 TTY/BOD5. The majority of those discharges are indirectly released by 27 hydrographic basins. In this respect, the most polluted areas are Valparaíso, Concepción and Iquique\(^90\).

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\(^{87}\) See POA/SEP/PMECA Report
\(^{88}\) Ibid.
\(^{89}\) Ibid.
\(^{90}\) See CABRERA, N., ARANEDA, E. Land based marine pollution in Chile. *Regional Diagnosis on*
Table 4: Marine Pollution from Domestic Sources in the SEPR
(Source: Carrasco y Muñoz, 1995)

<table>
<thead>
<tr>
<th>State</th>
<th>Total Volume TTY</th>
<th>BOD5</th>
<th>SS</th>
<th>STD</th>
<th>N</th>
<th>P MTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panama</td>
<td>78.20</td>
<td>50.55</td>
<td>16.47</td>
<td>29.40</td>
<td>26.62</td>
<td>0.32</td>
</tr>
<tr>
<td>Colombia</td>
<td>45.70</td>
<td>7.26</td>
<td>12.17</td>
<td>26.00</td>
<td>1.32</td>
<td>0.29</td>
</tr>
<tr>
<td>Ecuador</td>
<td>128.30</td>
<td>48.28</td>
<td>73.89</td>
<td>54.00</td>
<td>4.89</td>
<td>0.60</td>
</tr>
<tr>
<td>Peru</td>
<td>418.70</td>
<td>124.00</td>
<td>229.70</td>
<td>125.89</td>
<td>20.77</td>
<td>2.51</td>
</tr>
<tr>
<td>Chile</td>
<td>672.40</td>
<td>166.90</td>
<td>169.44</td>
<td>309.20</td>
<td>27.95</td>
<td>3.38</td>
</tr>
<tr>
<td>Region</td>
<td>1343.30</td>
<td>396.99</td>
<td>397.86</td>
<td>648.51</td>
<td>81.55</td>
<td>7.10</td>
</tr>
</tbody>
</table>

3.4.1.2 Pollution by Sewage Sludge in the SEPR

The food processing industry is the most representative in the PAPC. Here, sludge sewage comes mainly from livestock and poultry farms, and slaughter plants, on the one hand; and, from starch, glucose and dextrin production, and leather manufacturing process, on the other. The industrial sewage in the country is merely 12% of the total disposed into the Panama Bay, representing 43% of the organic contaminants that reach the Bay. In terms of industrial sewage, it has nearly calculated 10.5 MTY with 381 TTY/BOD5 discharged into the PAPC. The food industry, consisting of 150 companies, produces 6 MTY with 165 TTY/BOD5. The agricultural and livestock industries all together release 9 MTY with 300 TTY/BOD5\(^1\).

The industry in the COPC generates roughly 0.65 MTY of sewage. The concentration of organic pollutants has been estimated to be about 48 TTY/BOD5. Where 80% of the sludge belongs to fishery activities integrated by 26 plants of

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Activities and Polluting Terrestrial Sources Affecting the Freshwater and Coastal/Marine Environment in the South Eastern Pacific. CPPS/PNUMA. Quito (Ecuador) 1994.

\(^1\) See POA/SEP/PMECA Report.
process that produce 0.40 MTY. Timber exploitation discharges a 17% with 5.8
TTY/BOD5, coming from 0.14 MTY. The oil sector with 0.67 TTY and mineral
non/metallic companies do it with around 0.13 MTY\textsuperscript{92}.

From the total industry registered in Ecuador, 69% takes place in the EPC and is
hugely focused on the Province of Guayas. Food production represents 68% from
the full number in shore, estimated to be 55.2 MTY with 9.7 TTY/BOD5. In addition,
the fish processing industry, situated largely in Guayas and Manta, emanates 4.3
MTY of sludge. The manufacturing industry releases an estimated of 15 MTY solely
in Guayaquil y Machala. In Esmeraldas the oil refinery industrial process contributes
with 3 MTY through Teaone the River. The vegetable oil industry releases 5 MTY
especially in Guayaquil; and the metal and mechanical industry frees 15 MTY\textsuperscript{93}.

Industry in the PEPC is represented essentially by fish processing plants, mineral
and metallurgical companies, and oil refinery industrial conglomerates. They, all
together, contribute to marine pollution, representing 162.2 MTY with a likely organic
matter of 145 TTY/BOD5. The biggest impacts of pollution on shore are produced in
Chimbote, Paita y Pisco\textsuperscript{94}.

Industry in the CHPC consists of 311 industrial conglomerates tied in way or another
to direct pollution disposed of at sea. From this number 67 are located in the zone of
Talcahuano and the rest in other important areas of industrialized development,
such as Iquique, Antofagasta, Valparaíso and Puerto Montt. There are thousands of
macrobiotic materials produced by contemporary industries, from detergents to
pesticides and a quantity of those may be solved in wastewater; some are
distinguished as risk-free and some as noxious\textsuperscript{95}.

\textsuperscript{92} Ibid.
\textsuperscript{93} Ibid.
\textsuperscript{94} Ibid.
\textsuperscript{95} Ibid.
The Chilean modern copper exploitation, pulp and paper industry, and fish processing plants contribute with the largest significant amount of marine pollution in areas such as Valparaíso y Concepción.

<table>
<thead>
<tr>
<th>State</th>
<th>Total Volume TTY</th>
<th>BOD5</th>
<th>SS</th>
<th>STD</th>
<th>N</th>
<th>P MTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panama</td>
<td>10.50</td>
<td>38.10</td>
<td>33.50</td>
<td>33.70</td>
<td>64.50</td>
<td>0.50</td>
</tr>
<tr>
<td>Colombia</td>
<td>0.70</td>
<td>48.00</td>
<td>97.50</td>
<td>26.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ecuador</td>
<td>55.20</td>
<td>9.70</td>
<td>8.60</td>
<td>8.30</td>
<td>70.40</td>
<td>3.90</td>
</tr>
<tr>
<td>Peru</td>
<td>162.20</td>
<td>146.00</td>
<td>40.20</td>
<td>49.10</td>
<td>460.50</td>
<td>16.40</td>
</tr>
<tr>
<td>Chile</td>
<td>333.00</td>
<td>91.05</td>
<td>129.00</td>
<td>68.00</td>
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<td>30.00</td>
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<tr>
<td>Region</td>
<td>561.60</td>
<td>333.30</td>
<td>308.80</td>
<td>185.10</td>
<td>771.40</td>
<td>50.80</td>
</tr>
</tbody>
</table>

Table 5: Marine Pollution from Industrial Sources in the SEPR
(Source: Carrasco y Muñoz, 1995)

In the CHPC, the pollution is disposed of by the Maipo, Aconcagua, Andalien and Bio-Bio rivers, which carry up to 333 MTY with 91.5 TTY/BOD5. The 65.5% of the whole industry in Chile has an discharge system that mixes household and sludge sewages in just one drainage, and the 6.4% is taken to rivers and 6.0% directly into the sea\(^\text{96}\).

Regarding marine pollution from land-based sources, both domestic and industrial, it is concluded from the tables that Chile contributes in a vaster scale to the overall pollution of the SEPR.

In concluding this chapter, it has been observed that SEP/CPMECZ and the POA/SEP/PMECA provide essential principles for a better regional cooperation

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among the SEPR States. In this concern, countries in the region have the major elements to continue working in the reduction of marine pollution by all means in order to protect and preserve the coastal zone and marine environment with all means.

Furthermore, the continuous implementation of the existing agreements and protocols are essential for the reduction of marine pollution and protection of the environment, with the participation of the SPs of CPPS, a regional organization with an evident leadership, and with the support of international cooperation.

Then, sustainable fisheries is on the other hand a great concern that deserve to be studied, focusing the topic from different perspectives and gathering a new approach in order to perceive a wider picture. This will allow decision-makers implement more applicable policies, strategies and measures in the SEPR.
CHAPTER 4 SUSTAINABLE FISHERIES

Certainly, the UNCLOS sets up the international framework for conservation and management of marine living resources. In this connection, the Law of the Sea Convention categorizes fisheries subject to coastal state sovereign rights and those taking place on the high seas beyond national jurisdiction. Complementing the framework, Article 64 on Highly Migratory Species (HMS) establishes the regimen of sustainable use of shared stocks that are situated between waters of national jurisdiction and beyond\(^{97}\). In accordance with Article 61, Part V Exclusive Economic Zone, and Article 117, Part VII High Seas of the UNCLOS, all states are compelled to protect marine living resources, equally inside their own territories and beyond waters of national jurisdiction. As far as it is concerned in the SEPR, only two countries have ratified the UNCLOS, Panama in 1996 and Chile in 1997.

Along the same line, the Colombian Law 13/1990, referred as the Fishery’s General Statute, has included in its Article 8, Classification of Fishing Activities, those activities carried out in the high seas. Article 52, in this law as well, provides special national protection to those species declared as threatened or imminent extinction. Furthermore, the Colombian Law 99/1993 assigned the preservation of the marine environment and natural resources to the Ministry of Environment.

In addition, Article 3 of the Ecuadorian Law of Fisheries and Fishing Development Supreme Decree No. 178/1974 links the protection of national bioaquatic resources to the international conventions that have been ratified by the country, under the worldwide cooperation principle to comply with their sustainable use.

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\(^{97}\) See L.A. Kimball (2001), p. 25
Conversely, the Article 7 of the Peruvian National Fishing Law, under Decree No. 25977, raises the possible regulations given by the state to secure protection and the rational use of living marine resources within waters of national jurisdiction that might be applied beyond 200 nautical miles to migratory species.  

<table>
<thead>
<tr>
<th>UNCLOS Ratification</th>
<th>Chile</th>
<th>Peru</th>
<th>Ecuador</th>
<th>Colombia</th>
<th>Panama</th>
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<tr>
<td>UNCLOS (1982)</td>
<td>Chile</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Panama 01.07.1996</td>
</tr>
<tr>
<td>Agreement relating to the implementation of Part XI of UNCLOS</td>
<td>Chile</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Panama 01.07.1996</td>
</tr>
</tbody>
</table>

Table 6: UNCLOS and Part XI Ratifications by some SEPR states  
(Source: DOALOS/OLA Website)

In this concern, what is observed is that there is a lack of direct commitment towards the protection of living marine resources with a real implementation and enforce of the marine environmental law that could somehow replace the omission in the ratification of UNCLOS in their national legislations. Since the duty of States to preserve and protect the marine environment has been reflected and elaborated upon in numerous global conventions and regional instruments.

4.1 International and Regional Organizations in the SEPR

In this chapter is exposed how international organizations like ITLOS has helped in solving fishing disputes in some of SEPR States; the instruments developed by FAO for the sustainable use of living marine resources; the role of the IATTC in the

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98 See Instituto Tecnico Pesquero. Peru.  
regulation of tuna fishing in the Northern part of the SEPR; and finally the programmes carried out by the CPPS for the protection and rational utilization of marine ecosystems.

4.1.2 International Tribunal for the Law of the Sea (ITLOS)

The International Tribunal for the Law of the Sea (ITLOS) is an independent judicial body established by UNCLOS (1982) to adjudicate disputes arising out of the interpretation and application of the Law of the Sea Convention. The Tribunal was established by Annex VI of the Law of the Sea Convention, which is its Statute\textsuperscript{100}. Additionally, UNCLOS (1982), Article 287 mentions three more optional forums for dispute-settlement: the International Court of Justice; an arbitral tribunal constituted in accordance with Annex VII; and a special arbitral tribunal constituted in accordance with Annex VIII for one or more of the categories of disputes specified therein\textsuperscript{101}.

The Tribunal commenced operations in October 1996 and is composed of 21 judges having the highest reputation for equality and truthfulness and of acknowledged competence in the field of the law of the sea. They are elected for nine-year terms. The Tribunal performs three different but closely related functions: (a) to present a forum of option for states parties to UNCLOS to settle disputes relating to the interpretation or application of the provisions of the Convention; (b) to endow with a special, and largely mandatory, procedure for dealing with disputes in connection

\textsuperscript{100} Specifically UNCLOS: Annex VI Statute of the International Tribunal for the Law of the Sea. Article 1 General provisions 1. The International Tribunal for the Law of the Sea is constituted and shall function in accordance with the provisions of this Convention and this Statute. 2. The seat of the Tribunal shall be in the Free and Hanseatic City of Hamburg in the Federal Republic of Germany. 3. The Tribunal may sit and exercise its functions elsewhere whenever it considers this desirable. 4. A reference of a dispute to the Tribunal shall be governed by the provisions of Parts XI and XV.

\textsuperscript{101} Specifically UNCLOS: Article 287 Choice of procedure: 1. When signing, ratifying or acceding to this Convention or at any time thereafter, a State shall be free to choose, by means of a written declaration, one or more of the following means for the settlement of disputes concerning the interpretation or application of this Convention: (a) the International Tribunal for the Law of the Sea established in accordance with Annex VI; (b) the International Court of Justice; (c) an arbitral tribunal constituted in accordance with Annex VII; (d) a special arbitral tribunal constituted in accordance with Annex VIII for one or more of the categories of disputes specified therein.
with the understanding and application of the provisions of Part XI of UNCLOS; (c) to be a remaining and essential mechanism for the arrangement of certain disputes recognized by the Convention as requiring speedy decisions, such as mandatory applications for the prompt release of arrested vessels and crew.

As it has been stated, ITLOS may also deal with disputes arising under other maritime conventions, if these conventions so provide\textsuperscript{102}. Furthermore, the Tribunal has exclusive jurisdiction in disputes concerning seabed deep seabed mineral resources through its Seabed Disputes Chamber. On the same hand, five special chambers have been created: (a) Chamber of Summary Procedure; (b) Chamber for Fisheries Disputes; (c) Chamber for Marine Environment Disputes; (d) Chamber for Maritime Delimitation Disputes; (e) and, Chamber under Article 15, Paragraph 2, of the Statute\textsuperscript{103}.

### 4.1.2.1 Cases involving SEPR States

The ITLOS has dealt with three cases concerning countries in the SEPR; specifically with two Members States of the Convention: Panama and Chile. The exposure of the three cases will not approach any legal discussion, agreement or disagreement. They will be exposed in this paper in good faith in order that the reader is made aware of possible weaknesses to be observed in the protection of marine biodiversity in the SEPR.

**ITLOS Case No. 5 – The Camouco Case (Panama v. France)**

**Application for Prompt Release**: A French surveillance frigate seized the Panamanian vessel “Camouco” in September 1999. The vessel was apparently fishing in French territorial EEZ Zone of the French island of Crozet in the Antarctic region, being detained by national authorities. According to the process, the “Camouco” was observed undertaking longline fishing activities in the Southern seas

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about 160 nautical miles from the northern boundary of these French Islands. As it was mentioned in the process, 48 bags of fresh toothfish and related documents were jettisoned before the fishing ship was stopped. In addition, six more tonnes of frozen toothfish were found in the holds of the Camouco.

Firstly, the Panamanian authorities sought at the Tribunal: (a) the prompt release of the “Camouco” and its captain; (b) the declaration that France failed to comply with the Law of the Sea Convention, because it did not notify Panama of the apprehension act of the vessel and crew.

Conversely, the French authorities stated: (a) unlawful fishing in the exclusive economic zone of the Crozet Islands under French jurisdiction, since French laws implement the coastal State’s power to regulate activities within the EEZ to control an area up to 200 nautical miles from their land masses and distant island territories; (b) failure to declare entry into the exclusive economic zone of the Crozet Islands, while having six tonnes of frozen Patagonian toothfish on board the vessel; (c) concealment of vessel’s markings, while flying a foreign flag; and (d) attempted flight to avoid verification by the maritime authority.

In the end, ITLOS/Press 35 issued by the Register in Hamburg on 7 February 2000, delivered judgment in the “Camouco Case” (Panama v. France) determining the Vessel and its Master to be released on the deposit of 8 millions of French Francs, setting a standard for the reasonableness of the bond; this was approximately US$1.2 million\textsuperscript{104}. The case was considered and decided by a 21-member Tribunal. In relation to admissibility, the Tribunal did not find merits in the argument of France that by failing to act promptly, Panama had lost its rights under article 292 of the UNCLOS to request the prompt release of the “Camouco” and the Master. It notes that the Convention does not require the flag State to file an application at any explicit time after the arrest of a vessel.

\textsuperscript{104} Judgment available at United Nations Website.
ITLOS Case No. 7 – Conservation of Swordfish Stocks in the South Eastern Pacific Ocean (Chile and European Community): As was expressed in ITLOS/Press 43 issued by the Register in Hamburg on 20 December 2000, Chile and the European Community requested ITLOS to form a Special Chamber to deal with their dispute concerning the conservation and sustainable exploitation of swordfish stocks in the SEPR. As has been stated by the Statute of the Tribunal, Article 15 provides basis for the formation of a Special Chamber, if so requested by the parties to a dispute. The composition of the Chamber was constituted by the Tribunal, with the consent of the parties.

Objectively, the Special Chamber was called upon to verify, amongst other things, whether the EU had complied with its duties under the United Nations Convention on the Law of the Sea to guarantee maintenance of the stocks of swordfish in the fishing activities carried out by vessels flying the flag of any of its Member States in the high seas adjacent to Chile’s EEZ, whether the Chilean Decree which declares Chile’s conservation mechanisms regarding swordfish on the high seas was in breach of UNCLOS, and whether the “Galapagos Agreement” of 2000 was negotiated in keeping with the provisions of the UN Convention.

Continuously, the following years and by provisional agreement reached between parties, the President of the Special Chamber has extended the time-limit for making preliminary objections on four occasions. According to the latest information of Case No. 7, and at the request of the parties, the time-limit for the proceedings has been postponed for an additional year, until January 2010.

ITLOS Case No. 9 – The Chaisiri Reefer 2 (Panama v. Yemen)
Application for Prompt Release: The proceedings in the “Chaisiri Reefer 2” Case was instituted on 3 July 2001 by an application made on behalf of Panama against Yemen, under article 292 of the UNCLOS, for the prompt release of the vessel, crew and cargo which had been detained by the authorities in Yemen. The details of the application exposed the “Chaisiri Reefer 2” was arrested by Yemini coastguard officials, allegedly for violation of fisheries laws, while leaving the port of Mukalla
(Yemen) bound for Thailand. The vessel was ordered to sail back to Mukalla, where the cargo was offloaded.

Succinctly, ITLOS/Press 52 issued by the Register in Hamburg on 16 July 2001, subsequent to an agreement between Panama and Yemen and the “Chaisiri Reefer 2” (Panama v. Yemen) was removed from the Tribunal’s List of Cases. The vessel, crew and were released and were free to sail from Mukalla Port in Yemen. Above and beyond, the government of Yemen guaranteed that the same freight which was unloaded from the vessel would be packed back in good and proper form on the basis that the case would be withdrawn by the applicant.\(^{105}\)

In point of fact, the agent of Panama informed ITLOS that in accordance with the Rules of the Tribunal, Article 105, Paragraph 2, the parties agreed to discontinue the proceedings as a result of a settlement of the dispute regarding the arrest of “Chaisiri Reefer 2”.

The broader conclusion from the three cases settled by ITLOS is given by the fact that from the fifteen cases resolved by ITLOS in 10 years of existence, three have been submitted by Panama and Chile.\(^{106}\) This number represented a significant twenty percent, which can be optimistically seen as a great relevance given by the SEPR to this Tribunal and with this to international organizations working for the sustainable and equitable use of fishery resources.

4.1.3 Regional Fisheries Management Organizations (RFMOs)

In the wider spectrum, Regional Fisheries Management Organizations (RFMOs) are contained in what is called Regional Fishery Bodies (RFBs), that are defined as a group of States or organizations that are parties to an international fishery agreement and work together towards the protection and managing of fish populations. Then and there, RFMOs perform a crucial function in promoting

\(^{105}\) See ITLOS: Yearbook 2001, Volume 5 p. 41
\(^{106}\) The only SPs of UNCLOS in the SEPR.
sustainable fisheries and their proper maintenance and administration with the international cooperation\textsuperscript{107}.

As stipulated in UNCLOS for the creation of RFMOs, \textit{Part V EEZ} classifies certain types of fish according to their nature in feeding and breeding, even a group for specifically marine mammals is set in this charter. Within those, Highly Migratory Species (HMS)\textsuperscript{108} has been placed in Article 64, which leads to \textit{Annex I} of the Law of the Sea Convention\textsuperscript{109}.

In this respect, the list of HMS includes mainly the following genus: (a) tuna: \textit{Thunnus}, \textit{Katsuwonus} and \textit{Euthynnus}; (b) mackerel: \textit{Auxis}, \textit{Pomfret} and \textit{Bramidae}; (c) marlins: \textit{Tetrapturus} and \textit{Makaira}; (d) sail-fishes: \textit{Istiophorus}; (e) swordfish: \textit{Xiphius}; (f) sauries: \textit{Scomberesox} and \textit{Cololabis}; (g) dolphin-fish: \textit{Coryphaena}; (h) sharks: \textit{Hexanchus}, \textit{Cetorhinus}, \textit{Alopiidae}, \textit{Rhincodon}, \textit{Carcharhinidae}, \textit{Isurida} and \textit{Sphyridae}; and (i) Cetaceans families: \textit{Physeteridae}, \textit{Balaenopteridae}, \textit{Balaenidae}, \textit{Eschrichtiidae}, \textit{Monodontidae}, \textit{Ziphiidae} and \textit{Delphinidae}.

Complementarily, the principle of cooperation to guarantee the preservation and optimal use of fisheries resources both within and beyond the EEZ led the DOALOS/OLA to work with the SPs and non-SPs of UNCLOS in the adoption of the United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (FSA)\textsuperscript{110} in 1995. Briefly, the FSA institutes standards for the protection and administration of those fish stocks, which must be based on the precautionary approach and the best accessible scientific data; making sure of the compatibility

\textsuperscript{107} See FAO. Fisheries and Aquaculture Department, Regional Fisheries Bodies. FAO recognizes the essential role of RFMOs to achieve the goal of accountable and sustainable fisheries regionally.

\textsuperscript{108} Specifically UNCLOS. \textit{Part V EEZ Article 64 HMS} 1. The coastal State and other States whose nationals fish in the region for the highly migratory species listed in Annex I shall cooperate directly or through appropriate international organizations with a view to ensuring conservation and promoting the objective of optimum utilization of such species throughout the region, both within and beyond the exclusive economic zone. In regions for which no appropriate international organization exists, the coastal State and other States whose nationals harvest these species in the region shall cooperate to establish such an organization and participate in its work.

\textsuperscript{109} Specifically UNCLOS. Annex I HMS.

\textsuperscript{110} The FSA was adopted in New York, USA on 04.08.1995; and entered into force on 11.12.2001.
and coherency of these standards and measures in both areas under national jurisdiction and the high seas\textsuperscript{111}.

To some degree, this is a sensitive issue for coastal States, not only for SEPR States but also for all others around the world. In this regard, States fishing these genre of fish in remote waters have expressed that such species are not subject to the sovereign rights of the coastal States concerned during their transit through the EEZ and that regulation requires a special regime of international co-operation. Conversely, coastal States have argued that these species are found in areas where coastal States make effective sovereign rights in accordance with UNCLOS\textsuperscript{112}.

<table>
<thead>
<tr>
<th>Ratification in SEPR</th>
<th>Chile</th>
<th>Peru</th>
<th>Ecuador</th>
<th>Colombia</th>
<th>Panama</th>
</tr>
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<tbody>
<tr>
<td>Fish Stocks Agreement, 1995 (FSA)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Panama 16.12.2008</td>
</tr>
</tbody>
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Table 7: Marine Pollution from Industrial Sources in the SEPR
(Source: DOALOS/OLA Website)

4.1.3.1 Inter American Tropical Tuna Commission

The Convention for the Establishment of an IATTC\textsuperscript{113} was signed between the United States of America and the Republic of Costa Rica in Washington in 1949 in order to maintain mainly the populations of YFT and SKJ and other kinds of fish caught by tuna fishing vessels in the EPO.

The area of competence of IATTC is along the 50º N parallel from the coast of North America to the intersection with 150º W, and from that line to the intersection with 50º S and from that line to its intersection with the coast of South America.

\textsuperscript{111} See DOALOS/OLA. United Nations Conference on Straddling Fish Stocks and HMS.


\textsuperscript{113} The IATTC Convention was signed in Washington, USA on 31.05.1949. CEIATTC currently has 16 contracting parties: Colombia, Costa Rica, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Republic of Korea, Spain, USA, Vanuatu and Venezuela.
extending the estimated IATTC boundaries by 10º both North and South. In this regard, Panama, Colombia, Ecuador and Peru are SPs of the IATTC. Chile has not developed a fishery in YFT as its interest is in different marine species.

According to the 66th Meeting of IATTC and concerning the Regional Vessel Register Resolution, currently from the SEPR countries, there are 746 tuna fishing vessels registered. This number includes both longliners and purse-seiners. Whereas, Colombia and Peru have only 12 and 2 (all active purse-seiners) respectively; Ecuador 290 (89 active purse-seiners); and Panama, with the biggest number 442 (23 active purse-seiners)\(^{114}\), most registered as Flag of Conveniences (FOCs).

![Figure 5: Equipments for Tuna Fishing Vessels in the SEPR](image)

The biggest tuna fishing vessels in the SEPR are equipped with a helicopter and 5 speedboats for hunting the dolphins and catch YFT and SKJ. Dolphins are released as soon tunas schools are secured in the purse seine. Nevertheless, a very small percentage of these marine mammals do not survive. (Source: J. Plata Gonzalez)

In the tropical waters of the Eastern Pacific Ocean (EPO), the purse seine tuna fishery involves large\(^{115}\) YFT (Thunnus albacares) that swims together with

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\(^{114}\) See IATTC: Vessel Database. This Database is a detailed Regional Vessel Register that includes active, inactive and sunk purse/seine, authorized large longliner and even IUU vessels. From the SEPR countries there are two registers under this IUU Vessel List: A big Colombian purse/seiner called *Marta Lucia R.* with a gross tonnage of 1771; and a small Panamanian longliner named *Goldau Ruey No.1* with a gross tonnage of 99.

\(^{115}\) DOW: YFT with around 1.26 metres long.
particularly three species of dolphins: spotted (Stenella attenuata) spinner (Stenella longirostris) and common (Delphinus delphis). This oceanic relationship of tuna and dolphins is not clearly understood and has brought about two consequences: Initially a practical benefit, since it has created the basis of a flourishing tuna fishery, and in addition, a sensitive issue, because of the deaths of a large number of dolphins trapped in fishing nets. This is the core of this ecological problem. It might be believed the tuna join the dolphin by the simple natural territorialism of certain sorts of fish and the advantage of the higher skills of these marine mammals in finding schools of smaller fish for feeding\textsuperscript{116}.

Figure 6: Relation between Dolphins and Tunas in the SEPR

Left: Speedboaters guided by the fishing master who is aboard the helicopter planning the strategy to hunt the dolphins. Right: Common Dolphins (\textit{Delphinus delphis}) remain in the circle formed by the net that is slowly reduced until a backdown releases them. (Source: J. Plata Gonzalez)

In the EPO fishermen on board purse seine tuna vessels intentionally chase and capture dolphins in order to catch YFT. Then, as one of the final steps of the process they release the dolphins from the net by a mechanism called backdown. As a general rule, dolphins captured by the ETP tuna fishery are released alive, and an individual dolphin may be chased, captured and released many times during its

\textsuperscript{116} DOW: Only the biggest tunas search for the same size of smaller fish, as dolphins do.
lifetime. Nevertheless, the number of dolphins killed since the fishery began in the late 1950s has been estimated to be over six million, the highest number for any fishery\textsuperscript{117}.

Figure 7: The Backdown to Release Dolphins

The backdown submerges the net a couple of metres in the sea, allowing dolphins escape. In the meantime, many measures have to be taken to avoid their entanglement, especially when strong currents reduce the circle. (Source: J. Plata Gonzalez)

The Agreement on the International Dolphin Conservation Program (AIDCP) is a legally binding instrument for the conservation of dolphins and conservation and ecosystem management\textsuperscript{118} in the Eastern Tropical Pacific Ocean (ETP). The aims of the Agreement are to minimize incidental dolphin mortality in the tuna purse-seine fishery throughout the location of yearly limits, look for different options for capturing large YFTs rather than by this association with dolphins, and guarantee the long-term sustainability of tuna populations and oceanic resources in the Eastern Pacific Ocean\textsuperscript{119}.

\textsuperscript{117} See NOAA. The Tuna Dolphin Issue (2002): Protected Resources Division The Tuna Dolphin Issue Southwest Fisheries Science Centre.

\textsuperscript{118} During a Conference at the Scripps Institution of Oceanography, Dr. Paul Dayton, Professor of Biological Oceanography clarifies “to understand how the oceans works, it is important to know that we do not manage ecosystems they are too big, we manage human activities within ecosystems perspective”.

\textsuperscript{119} The AIDCP entered into force on 15.02.1999.
Finally, as soon as dolphins are released from the net, YFTs and SKJs are kept on wells with a temperature of minus 25 ° C. (Source: J. Plata Gonzalez)

Regarding SEPR, Ecuador, Panama and Peru, have ratified the AIDCP. Colombia is applying the Agreement provisionally.

4.1.3.3 Permanent Commission for the South Pacific

The Permanent Commission for the South Pacific (CPPS) is the appropriate maritime organism for the SEPR and was established in 1952. One of the objectives of the CPPS is to maintain the ecological balance in the utilization of living marine resources in the SEPR. In the literal sense as a RFMO, CPPS encourages general coastal and oceanic ocean policies to be implemented by SPs: Chile, Peru, Ecuador, Colombia and Panama, to secure the sustainable exploitation of fishing resources contained in waters of national jurisdiction and beyond in the high seas. The geographical area of CPPS covers up 200 nm of national jurisdiction as the EEZ of the SPs embracing pertaining islands.\(^{120}\)

\(^{120}\) See FAO. Fisheries and Aquaculture Department. Regional Fishery Bodies. CPPS.
As it has been explained previously, the CPPS was established by the Convention on the Organization of the Permanent Commission of the Conference on the Use and Conservation of the Marine Resources of the South Pacific (CO/CPPS/CUCMR)\textsuperscript{121} in 1952. In this respect, the legal framework of CPPS consists of fifteen more agreements and protocols on fisheries management and exploration.

![Image of a sperm whale](image)

**Figure 9. Marine Biodiversity in MPAs of the SEPR**

An adult sperm whale, *Physeter macrocephalus* is observed in front of Galapagos Islands in the SEPR swimming southwards, presumably to the Antarctic. (Source: J. Plata Gonzalez)

Furthermore, CPPS serves as an Executive Secretariat of the Plan of Action for the Protection of the Marine Environment and Coastal Areas of the South Eastern Pacific (POA/SEP/PMECA)\textsuperscript{122} established in 1981.

In addition, the CPPS is carrying out the Plan of Action for the Conservation marine Mammals in the SEPR, which is one of the most comprehensive projects in the

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\textsuperscript{121} The CO/CPPS/CUCMR, as a Convention that established the CPPS, was signed by Chile, Ecuador and Peru at the First Conference on the Use and Conservation of the Marine Resources of the South Pacific (FC/SEP/UCMR) in Santiago, Chile on 18.08.1952; Colombia joined the CPPS on 09.08.1979.

\textsuperscript{122} The POA/SEP/PMECA was approved at the same time with the SEP/CPMECZ in Lima, Peru on 12.11.1981.
protection of these seas species having involved directly national groups from recognized institutions in the region.

In this concern, there have been identified common characteristics and threats according to the UNEP Global Action Plan for the Conservation and Management of Marine Mammals. For instance, the direct exploitation and incidental capture, the touristic impact, and marine pollution and degradation of habitats that affected their normal cycles of life including migration in the SEPR. (See Figures 4 and 9)

Equally, marine turtles in the SEPR are basically represented by five species, two of them have been classified in critical danger by IUCN: the Leatherback Turtle (*Dermochelys coriacea*) and the Hawksbill Turtle (*Eretmochelys imbricata*), while the Green Sea Turtle (*Chelonia mydas*), the Olive Ridley (*Lepidochelys olivacea*) and the Loggerhead Sea Turtle (*Caretta caretta*) have been labeled as endangered species.

![Figure 10: Protection of Marine Turtles in the SEPR](image)

A wounded turtle trapped by tuna fishing net. Injuries or death to Chelonians are caused by the power block because of the lack of preventive measures to release the animal before continue rolling the net onboard. (Source: J. Plata Gonzalez)

As a consequence, the CPPS initiated in 2000 the Programme on Conservation of marine turtles in the SEPR which was incorporated into its agenda in order to
evaluate the conditions of these sea Chelonians and develop practical measures to protect them from imminent threats.

At the same time with the CO/CPPS/CUCMR, the Joint Declaration Concerning Fishing Problems in the South Pacific (JD/SEP/CFP)\(^{123}\) was signed by the same countries. Since then, the aims\(^{124}\) of the JD/SEP/CFP have been to study the migration and breeding of the species that have the most significance for human consumption; coordinate domestic and global scientific research while cooperating with RFBs with analogous goals; give advice on recommend SP the implementation of required regulations for the protection of fishing resources in the waters of national jurisdiction; and recommend governments only grant permits for domestic fishing when such operations do not jeopardize the preservation of the species involved.

Furthermore, the Framework Agreement for the Conservation of the Living Marine Resources on the High Seas of the South Eastern Pacific (FA/CLMR/HS/SEP)\(^{125}\), better known as the Galapagos Agreement, was signed by CPPS SPs in 2000. This agreement was intended to have as an objective the conservation of living marine resources in the high seas of SEPR, with particular orientation to HMS populations. The Agreement applies particularly to the high seas of the SEPR and at present, is not open to signature by non-coastal States. The pertinent high seas area is bordered by the outer limits of the coastal States’ national jurisdiction zones and a line following the longitude of 1200 West meridian, from the 500 North to 600 South latitudes.

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\(^{123}\) The JD/SEP/CFP was signed at the same time with the CO/CPPS/CUCMR by Chile, Ecuador and Peru at the FC/SEP/UCMR in Santiago, Chile on 18.08.1952; Colombia joined the JD/SEP/CFP on 09.08.1979, as well.  
\(^{124}\) See JD/SEP/CFP (1952), p. 2.  
\(^{125}\) The ACLMR/HS/SEP, also known as Galapagos Agreement, was signed in Santiago, Chile on 14.08.2000 by Chile, Peru, Ecuador and Colombia.
Complementarily, the FA/CLMR/HS/SEP was designed to pertain to waters of national jurisdiction corresponding to oceanic islands belonging to any of the coastal States without including adjacent waters. Presently, this Galapagos Agreement has not yet entered into force, and will not enter into force\textsuperscript{126}, since no all the SEPR States ratified it, but it does symbolize an important and effective structure for the maintenance of the marine resources of the SEPR\textsuperscript{127}.

4.2 South Eastern Pacific Region

In Latin America, Brazil and Colombia are only countries having defined and established a National Ocean and Coastal Zones Policy (NOZP). The other two in the continent are Canada and the United States of America (USA). Consequently, in the SEPR only Colombia has set up this important domestic instrument in order to assure, safeguard, preserve, and re-establish ecosystems and resources in both coasts and shared oceans, the Caribbean Sea and the Pacific Ocean. The Colombian NOZP was planned to enlarge the sustainability of coastal/marine economies and protect the maritime legacy, among others.

4.3 Code of Conduct for Responsible Fisheries

Fisheries and aquaculture provide an essential source of food and employment, among other services in economic well-being terms. Therefore, those activities should be performed in a responsible approach for present and future generations.

Unified around this precept, the SPs of the United Nations Food and Agriculture Organization of the United Nations (FAO) approved the Code of Conduct for Responsible Fisheries (CODE/FAO in 1995. Despite the CODEFAO being voluntary rather than compulsory, it urges the public and private sector involved in fisheries and aquaculture production worldwide in both inland areas and oceans, to entrust

\textsuperscript{126} See A. Jalil (2007): CPPS, Workshop on RFMOs Participating Rights. Santiago, Chile from 04.09.2007 to 05.09.2007

themselves to its principles and goals and take practical measures to implement them. By and large, the CODE/FAO symbolizes an international compromise on an extensive range of fisheries and aquaculture issues 128.

Decidedly, the CODE/FAO takes into account the biological characteristics of the marine resources, the ecosystems and biodiversity in which living resources 129 are found and their environment in one hand and the interests of consumers, trade and other users, on the other. In brief, the CODE/FAO comprises principles and international standards of conduct for responsible actions ensuring effectual preservation, and administration. Besides, it depicts how fisheries should be managed responsibly and how fishing operations themselves should be conducted.

Figure 11: Bycatch in Fishing for YFT and SKJ
The bycatch produced by using FADs is observed. For instance, many times the discard exceeds the capture of YFT as observed. The biggest dolphin fish (*Coryphaena hippurus*) will be retain onboard for commercial purposes while the jumbo squid (*Dosidicus gigas*) will be throw death into the sea. (Source: J. Plata Gonzalez)

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128 See FAO. Fisheries and Aquaculture Department.
129 Including marine resources inside and beyond waters of national jurisdiction, according to the CODE/FAO.
Nevertheless, the Colombian NOZP poses a huge weakness in consistency with international law, in conjunction with customary international law as considered in UNCLOS, essential marine protection conventions and agreements that have been derived from the Law of the Sea Convention\textsuperscript{130}. In this connection, only an action is mentioned as a strategy linking the CODE/FAO. Specifically to the promotion of national institutions in “diversification of fishing activities in order to minimize the effort on marine living resources that evidences clear signals of overfishing; allowing the recovery of such stocks, in accordance with appropriate national and international law”\textsuperscript{131}.

4.3.1 International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (IPOA/Seabirds)

The longline fisheries in which incidental hooks of marine birds occurred are essentially: (a) tuna, swordfish and billfish in some particular parts of the oceans; (b) Patagonian toothfish in the Southern Ocean, and (c) halibut, black cod, Pacific cod, Greenland halibut, cod, haddock, tusk and ling in the northern oceans (Pacific and Atlantic). As it was mentioned in the introduction, the species of seabirds most frequently taken are albatrosses and petrels in the Southern Ocean, northern fulmars in the North Atlantic and albatrosses, gulls and fulmars in the North Pacific fisheries.

Under these circumstances, the CODE/FAO particularly brings up the appropriate measures to minimize the catch of non-target species, both fish and non-fish classes, and harmful impacts on related or reliant species, in particular jeopardized species. In addition, the CODE/FAO encourages States and subregional or regional fisheries management organizations and arrangements to promote the feasible

\textsuperscript{130} UCW. The lack of international maritime education is evident in Latin American countries like Colombia.

\textsuperscript{131} See Colombian NOZP. p. 24.
employment of selective, environmentally harmless and cost effective gear and methods\textsuperscript{132}.

Consequently and in order to strengthen the implementation of these selective fishing measures, the CODE/FAO involves a combined work and cooperation within domestic fishing industry, fishermen and relevant national institutions, where the latter should draw up laws and regulations recommending selective fishing gear, methods and strategies to minimize sufficiently the discard and bycatch of non-target species\textsuperscript{133}.

Taking into consideration the background that represented the CODE/FAO, following some Technical Working Group (TWG) meetings, FAO adopted the voluntary International Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries (IPOA/Seabirds) in 1999. The IPOA/Seabirds calls for SPs of FAO to evaluate its longline fisheries and if a seabird bycatch problem exists, then a National Plan of Action would be developed\textsuperscript{134}.

4.3.2 International Plan of Action for the Conservation and Management of Sharks (IPOA/Sharks)

The present dissertation in marine biodiversity protection gives particular interest to the protection and sustainable management of Chondrichthyes in the SEPR, which are represented specially by sharks. In this respect, the International Plan of Action for the Conservation and Management of Sharks (IPOA/Sharks), as essential part of the CODE/FAO, will be presented in regard to what every state of the SEPR is doing to achieve their goals.

\textsuperscript{132} See CODE/FAO. Article 7.6.9. Additionally, this article highlights other technical measures that must be taken into account like the ones related to fish size, gear, discards, closed seasons and zones reserved for selected fisheries.

\textsuperscript{133} Ibid. Article 8.5 Fishing gear selectivity. Complementarily, this Article refers to research projects and transfer technology required for getting improvements in fishing gear selectivity, and fishing methods and strategies, dissemination of the results.

\textsuperscript{134} See K. Rivera (2001), Summary.
Along with seabirds, a new concern was recently observed regarding the increasing rate of shark catches and the ecological costs involved in the populations of some kinds of Chondrichthyes in the world's oceans. A strong reason for this alarm has been the fact that sharks often have a close stock-recruitment relationship, long recuperation times in reaction to over-fishing, like tardy sexual maturity and breeding in a slower pace, and complex spatial structures in the vein of size-sex segregation and seasonal migration\textsuperscript{135}.

Clearly, the FAO Committee on Fisheries (COFI/FAO) realized a decade ago that improvements in the knowledge of the state of shark stocks and the collection of necessary information were required. Even more, considering that certain multispecies fisheries are encountering sharks as a significant bycatch, these measures should be taken urgently. Then, various expert-consultation meetings were organized, and FAO adopted the voluntary International Plan of Action for Conservation and Management of Sharks (IPOA/Sharks) in 1999.

Laconically, both the IPOA/Seabirds mentioned previously and the IPOA/Sharks are FAO voluntary instruments and have been constituted within the framework of the CODE/FAO. This applies to States in the waters of which longline fisheries are being carried out by their own or foreign ships, and to States that perform these baited-hook lines in the EEZ of other States, or on the high seas\textsuperscript{136}. For practical reasons, the word “shark” in the IPOA/Sharks refers to all species belonging to the Class Chondrichthyes and covers both target and non-target catches. On the other hand, the term “true sharks” allocates sharks merely; and the term “shark catch” is referred to sharks that are harvested directly or as a bycatch in any circumstance and during any kind of fishing activities\textsuperscript{137}.

\textsuperscript{136} See above n 131. Article 2 (d), and the provisions of Article 3, where the interpretation and application of this document and its relationship with other international instruments are exposed, and the fact that all concerned States are encouraged to implement it.
\textsuperscript{137} See FAO. Elements of IPOA/Sharks (2000); and Shark Advisory Group and Mary Lack (2004) Shark/Plan, Department of Agriculture, Fisheries and Forestry, Australian Government.
The objective of the IPOA/Sharks is to ensure the conservation and management of sharks and their long-term sustainable use. For these purposes, States should adopt a National Plan of Action (NPOA) for the conservation and management of shark stocks if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries and involving the experience of subregional and regional fisheries management organizations should be taken into account where appropriate. Nevertheless, each State is responsible for developing, implementing and monitoring its own NPOA.

4.3.2.1 Panamanian National Plan of Action for the Conservation and Management of Sharks (NPOA/Sharks)

The Panamanian Fishing General Law dated from the late fifties\textsuperscript{138}, had as a wide-ranging purpose the regulation of all fishing activities for the maintenance, conservation and sustainable development of marine living resources in waters of national jurisdiction. Respectively, the National Fishing Commission (NFC) works as a consultative and recommendation-maker body for the Government, and the Panamanian Maritime Authority applies the concerned regulations.

Consequently, with both international CODE/FAO with the IPOA/Sharks and the national legislation explained in the previous paragraph, the draft for the Panamanian NPOA/Sharks was proposed in 2006. In general, the fishing of sharks has been carried out in Panamanian jurisdictional waters by vessels flying the national flag in coastal areas, since 1988. As it has formerly described, finning in Panamanian marine waters is causing significant unjustifiable damage to the populations of these Chondrichthyes and the surrounding ecosystems.

According to national statistics, there have been 3365 artisanal ships registered working in Panamanian Pacific waters. Of this number, merely 1412 boats have a

\textsuperscript{138} See Panamanian Fishing General Law (1959): Law Decree N° 17 approved in Panama (Panama) on 09.07.1959. It is known as the Basic Fishing Law and consists of 70 articles regulating activities in both internal waters and at sea. The main topics considered are definitions and disposition, prohibitions, vessels and licenses in fishing activities, as a whole.
license for catching fish, and the rest are licensed for shrimp. As fishing gears and methods for fishing sharks, Panamanian fishermen use preferably gillnets, entangling and drifting nets. These techniques generate other related problems such as an undesirable bycatch and the capture of specimens below minimum size limits. The draft for the Panamanian NPOA/Sharks has considered mainly three families of Chondrichthyes, as follows: Carcharhinidae (Common sharks), Sphyrnidae (hammer sharks) and Alopidae (thresher sharks).

4.3.2.2 Colombian National Plan of Action for the Conservation and Management of Sharks (NPOA/Sharks)

Admittedly, only a few nation have detailed management plans for their shark catches, which should include rules of access and practical methods together with reduction schemes of elasmobranches bycatch and support for complete use of them. Hence, States were encouraged by FAO to establish NPOAs for sharks by the Committee on Fisheries (FAO/COFI) in the 24th Session, which led to the Resolution Conference 12.6 on the conservation and management of sharks. The Resolution recognizes the vulnerability of sharks to overexploitation owing to their late maturity, longevity and low fecundity. Besides other arguments, adds the fact that the Red List of Threatened Species of IUCN lists 79 shark taxa from the 10 per cent of taxa for which Red List assessments have been made.

With the previous words as a background, the Colombian authorities, based on the Ministries of Environment and Agriculture, have created a National Committee in order to formulate the concerned NPOA/Sharks with the international cooperation of FAO, CITES and some NGOs. The main tasks of this National Committee are as

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139 Ecuador is the only country from the SEPR that has a NPOA/Sharks registered by FAO.
140 See CITES (2003). Resolution Conference 12.6 on Conservation and management of sharks. The Final Text was adopted in Geneva Switzerland on 13.02.2003. The Resolution recognizes that the IPOA/Sharks prepared by FAO in 1999 all States whose vessels conduct directed fisheries or regularly take sharks in non/directed fisheries are encouraged by FAO/COFI to adopt a NPOA/Shark.
141 As a starting point for the Resolution Conference 12.6 on Conservation and management of sharks; this indicates how vulnerable to extinction the Class Chondrichthyes is.
142 See the Colombian NPOA/Sharks (2007). A National Committee to formulate the NPOA/Sharks was created and is currently integrated by the Ministries of Environment and Agriculture, INVEMAR, National Natural Parks Unit and national NGOs.
follows: (a) to identify the stakeholders that should participate in developing the NPOA/Sharks and defining their responsibilities; (b) to propose the fundamental elements for the NPOA/Sharks such as context, objectives, activities, duties and budget; (c) to carry out the most relevant strategic activities for the implementation of the NPOA/Sharks in the short, medium and long term; (d) to characterize the fishery of Chondrichthyes bio-ecologically, socio-economically and commercially at the national level; and (e) to strengthen the required tools for better national fishery statistics.

4.3.2.3 Ecuadorian National Plan of Action for the Conservation and Management of Sharks (NPOA/Sharks)

In accordance with FAO, in the Ecuadorian territorial seas and waters surrounding Galapagos Islands 23 families of elasmobranches have been reported representing 46 species of sharks and 22 of rays and mantas, together with guitarfish and torpedoes. The sharks reported in Ecuador from industrial and artisanal fishing landings belong to the following families: *Alopiidae, Carcharhinidae, Lamnidae, Sphyrnidae* and *Triakidae*, while from the second group the most representative are: *Dasyatidae, Mobulidae, Myliobatidae, Rajidae* and *Rhinopteridae*.

As it has been stated by the Ecuadorian National Fisheries Institute, knowledge on the basic biology of most of the species of elasmobranches and on shark and rays abundance estimates is very incipient, being factors that make the management and regulation of these kinds of fisheries difficult. With these arguments, the Ecuadorian IPOA/Sharks was formulated in 2005 to be implemented within its four main industrial fishing fleets (tuna purse-seine for tuna, coastal purse-seine for herring, bottom trawling for shrimp, and multi-species longline), artisanal fisheries and all related stakeholders.

The major objectives for Ecuadorian IPOA/Sharks includes within other: (a) to enhance nationally the Chondrichthyes catch reduction; (b) to enhance the assessment of threatened species in specific shark fisheries; (c) to continue making progress in bio-ecological and fishery studies of the most vulnerable and
endangered of elasmobranches; (d) to minimize cryptic fishing mortality of sharks as a targeted species and as a bycatch; (e) to protect the biodiversity, structure and function of ecosystems involving Chondrichthyes; (f) to reduce discards of sharks, in compliance with the CODE/FAO¹⁴³ demanding to stop shark finning and retaining the whole body of sharks on board; (g) to improve identification guides for species of sharks and rays to help in the catch data collection, making more dynamic the fishery statistics process.

At this stage and complementarily to what is expressed in the CODE/FAO, shark finning has been defined by IUCN¹⁴⁴ as the extraction and preservation of shark fins, throwing at sea the corpse into the water. Thus, finning and dumping of shark carcasses is wasteful of protein and other potential goods derived from sharks, using only from two to five percent of the shark and discarding the remains at sea.

4.3.2.4 Peruvian National Plan of Action for the Conservation and Management of Sharks (NPOA/Sharks)

Although, fishing for sharks at the international level is a matter of great concern based on the biggest global fleets that have raised their annual catches of the fragile species of Chondrichthyes, in Peru it is still exclusively an artisanal fishery. Nevertheless, concerning the studies and knowledge of those species is incipient; only a few isolated and discontinued research attempts have been made. With this in mind, the first steps towards a sustainable domestic capture of sharks are the collection, process and analysis of data that allow the assessment of their main stocks in Peruvian jurisdictional waters.

¹⁴³ See above n 131. Article 7.6.9. Specifically, this article emphasizes the need to take suitable measures to reduce waste, discards, catch by lost or discarded gear, catch of non/target species, and impacts on associated species, particularly the most vulnerable species.

¹⁴⁴ See IUCN (2003). Shark Finning, p. 2. In this respect, the CODE calls upon nations to diminish waste and discards. The practice of finning is clearly contrary to this requirement, and to the guiding principles, objective and aims of the IPOA/Sharks. Then, NPOA/Sharks for countries catching Chondrichthyes in target or bycatch fisheries should incorporate effective measures as a precautionary approach for their protection.
Similarly, FAO directly or through the IPOA/Sharks, encourages nations worldwide to develop their own NPOA/Sharks. Therefore, with the FAO technical assistance and support, and the cooperation supplied by the Latin American Organization for Fisheries Development (OLDEPESCA), Peru configured its NPOA/Sharks in 2005. The objectives of the Peruvian NPOA/Sharks are: (a) to secure shark catches are sustainable; (b) to recognize and assess threats to stocks of Chondrichthyes in national waters; (c) to supply special attention to susceptible and endangered species; (d) to identify and protect their most sensitive habitats; (e) to encourage full use of sharks as soon they have been caught; (f) to improve, standardize and systematize the biological information of sharks; (g) to facilitate better data on and monitoring of shark catches and landings; and (h) to establish a national information system.

In view of the new Peruvian NPOA/Sharks, two dictates were approved by the government. Firstly, the Resolution No. 209/2001/PE, which establishes a minimum size limit on commercial fish including the following sharks: Carcharhinus spp, Prionace glauca, Isurus oxyrinchus, Mustelus whitneyi, Mustelus mento and Triakis maculate, a complementarily, Resolution No. 252/2000/P, which legalizes regulations on fisheries for cod in deep waters and establishes as a bycatch three species of Chondrichthyes: chimaeras Hydrolagus sp, rays Bathyraja sp, and sharks Somniosus pacificus.

4.3.2.5 Chilean National Plan of Action for the Conservation and Management of Sharks (NPOA/Sharks)

In relation to the participative guiding principle included in the IPOA/Sharks, Chile as a SEPR State that contributes to the fishing mortality of Chondrichthyes, has

145 See the Peruvian NPOA/Sharks (2005). The “Workshop on Diagnosis and Formulation of the Peruvian NPOA/Sharks”, held by OLDEPESCA, FAO and the Peruvian Marine Institute (IMARPE), led to its configuration.

146 The Peruvian Resolution No. 209/2001/PE was signed in Lima (Peru) on 26.06.2001, based on the article 2 of the Fishing General Law, Decree No 25977.

147 The Peruvian Resolution No. 252/2000/PE was signed in Lima (Peru) on 28.09.2000 approving the Fisheries for Cod Regulation Plan. The Plan has considered as a bycatch the followings species of Chondrichthyes which compete which cod for the same food: Hydrolagus sp, Bathyraja sp, and Somniosus pacificus, among others species.
designed and adopted a NPOA/Sharks\textsuperscript{148}. In the management of fisheries for sharks the major struggles encountered are: (a) classification problems; (b) inappropriate accessible data on catches, effort and landings of all species of sharks, skates, rays and chimaeras; (c) complexity in identifying species after landing; (d) unsatisfactory biological and ecological data; (e) reduced funds for research; (f) little coordination on the collection of information on transboundary, straddling, highly migratory and high seas stocks of sharks; and (h) difficulty in achieving shark management goals in multispecies fisheries in which sharks are caught; as a whole\textsuperscript{149}.

The objective for the Chilean NPOA/Sharks is to secure the biodiversity conservation of the families included in the Class Chondrichthyes in the sustainable long-term fisheries. As a planning strategy, it is constituted by 30 objectives and 6 lines of action. Accordingly, the respective lines of action considered in the Chilean NPOA/Sharks are in relation to: (a) conservation; (b) accessibility and assignation; (c) governance; (d) observation, control, surveillance and sanction system; (e) research; and (f) institutionalism.

Moreover, every specific objective consists of goals and activities organized in such a manner that are estimated by national institutions to be reached in the short, medium and long-term in sequential simultaneous stages being measured by punctual verification means. In the broader view, the Chilean NPOA/Sharks takes into account all the phases involved in the fishing activities such as landing and storing, transport, trade and research; and the concerned stakeholders working with Chondrichthyes and derived products like fishermen, fish handling and unloading employees, boat owners and fisheries research institutions, at the national level. Consequently, the Chilean NPOA/Sharks applies to the Chilean territory and other waters recognized by the international agreements; and, for vessels flying its flag that are dedicated to catch sharks and related species in the waters of national jurisdiction and beyond.

\textsuperscript{148} See Chilean NPOA/Sharks (2006). During 2003 Chile started formulating the NPOA/Sharks to which the National Strategy on Biodiversity including basic guidance for developing this POA was incorporated. Eventually in 2006, the Chilean NPOA/Sharks was approved by the national authorities.

\textsuperscript{149} Ibid.
4.3.2.5 Guidance on Sustainable Management of Sharks in the Tropical Eastern Pacific (GSMS/TEP)

Conscious of the gravity of the unrestrained depletion of sharks in all oceans, the Resolution\textsuperscript{150} also encourages member SPs to acquire information on formulation and implementation of IPOA/Sharks from their fisheries sections and divisions, and report directly to the CITES Secretariat and at future meetings of this Fisheries Committee.

Thus, the research, training, data collection, data analysis and the development of shark management plans outlined by FAO has to be included in NPOA/Sharks, as well as the identification of endangered species of Elasmobranches in territorial seas by coastal States.

Therefore, supported on the IPOA/Sharks and the FAO/COFI Resolution and in order to protect the marine biodiversity shared by Ecuador, Colombia, Panama and Costa Rica, the four countries signed the Guidance on Sustainable Management of Sharks in the Tropical Eastern Pacific (GSMS/TEP)\textsuperscript{151}.

As a priority, an urgent regional management plan has been set out in the GSMS/TEP for the followings species of sharks: \textit{Sphyrna lewini, Isurus oxyrinchus, Carcharhinus falciformis, Alopias pelagicus} and \textit{Prionace glauca}. The GSMS/TEP is based in the consideration that the four countries are signatories of numerous international and organizations, conventions, and agreements, such as UNCLOS, FAO, CBD, CITES, IATTC, OLDEPESCA, OSPESCA, among others.

\textsuperscript{150} Referred to the CITES Resolution Conference 12.6 on Conservation and management of sharks.
\textsuperscript{151} The GSMS/TEP was signed by Ecuador, Colombia, Panama and Costa Rica in Panama (Panama) on 24.04.2009.
Figure 12: The Unsustainable Practice of Finning in the SEPR

An adult silky male shark (*Carcharhinus falciformis*), on the top and a hammerhead female shark (*Sphyrna zygaena*) on the bottom, waiting in deck to be “finned”. These are some of the main species of Chondrichthyes affected by this unsustainable practice in the SEPR. (Source: J. Plata Gonzalez)

The general objective of the GSMS/TEP is to secure sustainable fishing activities on sharks stocks in the TEP. Beyond that the joint management and regional promotion of alliances and strategies have been incorporated in the Guidance as specific aims for the most appropriate management of these HMS in the maritime zone shared. This zone is called the Eastern Tropical Pacific Marine Corridor (ETPMC)\(^\text{152}\) and refers to the marine reserves surrounding the Galapagos National Marine Wild Life Reserve (Ecuador), Malpelo Marine Sanctuary for Flora and Fauna (Colombia), Coliba National Park (Panama), and Coco Island National Park (Costa Rica), from which its biodiversity conservation is one of the main concerns.

In the discussion of sustainable fisheries, it has been considered that every year tens of millions of sharks die because of finning. Finning is the cruel practice of lacerating off the sharks’ fins and casting their still alive bodies back into the sea. As soon as the elasmobranches are wasted away, they are eaten alive by other fish, or merely sink, as they are not able to move their gills and cannot take out oxygen from the water. Shark fins are being collected in ever larger numbers to supply the growing demand for exotic cuisine.

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\(^{152}\) The ETPMC was formalized and signed by Ecuador, Colombia, Panama and Costa Rica in San Jose (Costa Rica) on 02.04.2004. It is known as the San Jose Declaration.
Consequently, finning is not only a barbaric practice, but also an unsustainable process that is pushing many species closer to extinction. Since the 1970s the stocks of several species have been devastated by over 95%. Due to the covert character of finning records and statistics of sharks and species caught are not well kept.

4.4 Fishery Statistics Programme

As far as practicable, global categorizations and harmonized data submission processes must be kept in order to make sure that the gathered fishery information shared is comparable across nations allowing analyses at the regional and global levels. Fisheries statistics at the international level, which are collected, analyzed and published by FAO, are habitually acquired from nationwide reporting bureaus and most of the time verified from other sources. Sometimes, approximations are generated when data is absent or considered defective.\(^\text{153}\)

Accordingly, it has been considered important to include a short paragraph regarding fishery statistics programme in the present paper since the acquisition of reliable fishing data plays is a basic role in the good management of living marine resources. In the SEPR, the CPPS is conducting the Fishery Statistics Programme to inform and guide SPs in the development of tools and practical designs for collecting data of national fishing activities. This process at this level has to be implemented in an integrate pattern between public and private sectors involving all stakeholders.

Summarizing the chapter, only two countries have ratified UNCLOS Panama and Chile and solely Panama has done the same with the FSA. This small number evidences the lack of appropriate regional policies to encourage a wider protection

\(^{153}\) See FAO. Fisheries and Aquaculture Department. Fishery Statistics Programme. In this concern, Fisheries and Aquaculture Information and Statistics Service has recognized the need to improve the data that are collected, undertakes statistical development and coordinates actions at international and national levels, conducting the Organization's statistics programme for fisheries and aquaculture.
of marine biodiversity in the SEPR by its SPs. Nevertheless, specific national and regional programmes regarding conservation of living marine resources have been taken place in the decade, some of them in a secluded way in particular areas of the Pacific coast and islands. The impact of those isolated projects might hardly be measured and maybe big efforts made in this regard by local institutions or communities would just vanish by the time.

Then, the answer to this concern seems to be in the strengthening of national and regional strategies throughout interdisciplinary and integrated programmes that enhance work and cooperation in the conservation and sustainable use of living marine resources in the SEPR.

In relation to IATTC, despite the valuable programmes and measures proposed for sustainable tuna fishing activities in the SEPR, the enforcement of such measures is in the SPs hands. For instance, prohibitions in the use of FADs are contemplated in many IATTC Resolutions, and even national maritime legislations for the countries in the region, nevertheless these regulations are completely ignored on board of vessels fishing for tuna in the SEPR. As fishing masters are restricted by a specific Dolphin Mortality Limit (DML), fishing masters just increase the number of FADs that will guarantee a better tuna fishing, increasing as well, the amount of bycatch and with this the disagreeable finning of sharks.

With this in mind, it is concluded that one of the weaknesses for the protection of marine biodiversity in the SEPR is located in the enforcement of the law and regulations. Then, the NPOA/Sharks would only be effective if they can be enforced appropriately in the region.

Additionally, fisheries statistics are essential for a good management of the marine resources. Then, more training throughout international cooperation might be sought. For instance, the Wageningen International, a Dutch institution offer the possibility of short programmes to instruct and guide professionals in data collection and analysis and evaluation. Some agreements could be found by RFMOs in the SEPR with this organization in order to prepare personal from their SPs.
Finally, it has been verified the significance of MPAs in the protection of the marine environment and its resources. Then a chapter in this respect connects to these recent options for coastal/marine conservation.
CHAPTER 5 MARINE PROTECTED AREAS

5.1 Introduction to Marine Protected Areas

The Marine Protected Areas (MPAs) are special places in the ocean where resources are protected by laws and regulations. The ocean is changing dramatically as the planet warms in such a manner that causes alarm to the scientific community, which has begun to study MPAs as a tool for managing the sea and that research through time has become very convincing. For instance, NOAA in the United States of America (USA) has classified MPAs into three parts: reserve, park and conservation area. Consequently, a reserve is an area where it is not possible to extract anything; not just living marine resources but also geological and cultural materials. A park is an area where there cannot be extracted anything commercially and there may be some restrictions on the take of or extraction of resources on a recreational basis. Finally, a conservation area is a sort of combination of commercial and/or recreational area with extractive limitations.

Studies show that protecting critical marine habitats, such as warm and cold water coral reefs, sea grass beds and mangroves, are able to dramatically increase fish size and number. There are an amount of benefits that MPAs offer, not only to the ocean but also to users of the marine environment. The MPAs are a management tool since ecosystems can be protected as large swaths of habitats. Formerly, tools were used for individual species rather than for habitats upon which they rely; and this is a most effective way for their conservation. Then, with MPAs there are many advantages to multiple species and habitats. If they are designed correctly, a series of MPAs can function as a network, benefiting not only the specific MPAs but also across and between MPAs, since many species can move from one MPA to another through their larvae or as adults.
5.2 Introduction to Particularly Sensitive Sea Areas

The Particularly Sensitive Sea Area (PSSA) is a zone in the ocean that requires exceptional concern through action by IMO, and its implication for acknowledged environmental, social, economic and/or scientific grounds which may be susceptible to damage by worldwide activities at sea. The principles for the recognition of PSSA and for the designation of a Special Area (SA) are not exclusive. In many cases a PSSA might be identified within a SA, and a SA maybe within a PSSA\textsuperscript{154}.

Accordingly, 12 PSSAs have been identified around the world. From this number three are located in the SEPR, as follows: Malpelo Island, Colombia (2002), the Galapagos Archipelago, Ecuador (2005) and Paracas National Reserve, Peru (2003). As a short conclusion, it is observed that three PSSAs in the SEPR is a rather large number, representing 25% of the totality worldwide.

On the other hand, special areas (SAs) are defined by MARPOL as regions at sea that for scientific motives involving their oceanographic and environmental situations and to their maritime passage, the implementation of exceptional compulsory schemes for the avoidance of pollution is essential. This concept is especially applied for a better management in enclosed and semi-enclosed seas. Under MARPOL, these SA are presented with an upper level of protection than other areas of the sea. The SAs are identified in MARPOL Annex I Prevention of pollution by oil, Annex II Control of pollution by noxious liquid substances and Annex V Prevention of pollution by garbage from ship. In this regard, in the SEPR no SAs have been identified.

5.3 Marine Protected Areas of the South East Pacific

At this stage of the dissertation, the most important characteristics and structure of national institutions that are in charge of the regulation of marine protected areas (MPAs) are presented.

5.3.1 Panamanian Marine Protected Areas

The Panamanian Protected Areas National System (SINAP)\textsuperscript{155} consists of sixty-five sheltered areas representing the 34.4\% of the national territory. From this number, twenty-nine are considered MPAs, and just twenty-one situated in the Panamanian Pacific. In 1998, the General Environmental Law No. 41 was approved, which considers national policies for the preservation, protection, sustainable use, recovery and administration of the coastal/marine biodiversity, among others. Additionally, the Aquatic Resources Authority was recently created by Law No. 44. This law unified the supervision of coastal/marine resources and fishery/aquaculture activities. Then, the system established Special Marine Protected Zones, selecting the most fragile and sensitive ecosystems to provide new tools for better integrated management.

5.3.2 Colombian Marine Protected Areas

The first MPAs created in Colombia were grouped in a National Natural Parks System (SPNN) during the 1970s. The system represents a fundamental strategy for biodiversity conservation. Nevertheless, in most of the cases, the establishment of MPAs have been the result of political decisions rather than as tools for planning, and the lack of technical criteria in their selection and delimitation is evident\textsuperscript{156}.

However, the general principle in choosing this alternative form of protection is mainly related to the deficient knowledge about the marine zones. In short, there are 12 MPAs incorporated in the SPNN. From this number, eight are located in the Caribbean Sea and four in the Pacific Ocean. This means less than 1\% of the territorial sea is protected under this figure\textsuperscript{157}.

\begin{footnotesize}
\textsuperscript{155}The SINAP was created by the Board of Directors of the National Natural and Renewable Resources Institute (INRENARE) Resolution No. 022/92 in 1992.
\textsuperscript{156}See Mar Viva (2006). \textit{Áreas Marinas Protegidas}.
\textsuperscript{157}\textit{Ibid}.
\end{footnotesize}
There have been considered complementary conservation instruments such as MPAs networks, fishery control plans and integrated systems of management taking into account social-economic, cultural and political-administrative factors\textsuperscript{158}.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure13.png}
\caption{MPAs for Protecting Marine Biodiversity in the SEPR}
Prior to the declaration of the Colombian island of Malpelo Fauna and Flora Sanctuary as a MPA, fishing activities were carried out around these big oceanic rocks, as observed. MPA seem to be an important international strategy to preserve marine biodiversity in the SEPR. (Source: J. Plata Gonzalez)
\end{figure}

5.3.3 Ecuadorian Marine Protected Areas

The Ecuadorian coastal and marine environment has particular South Pacific features containing tropical warm ocean waters coming from the Northern part of the Equatorial line; as well as subtropical waters from the South. Under the same reference, the Ecuadorian littoral is reached by 67 rivers from which there are three main hydrographic basins: Esmeraldas, Guayas y Jubones. They have particular favourable physical conditions for a rich biodiversity. In brief, there are thirty-six Ecuadorian MPAs; twenty-five tied to the continental shelf, nine to the coastal region and two in the Galapagos Islands.

\textsuperscript{158} Ibid.
5.3.4 Peruvian Marine Protected Areas

Currently, the Peruvian Protected Areas Natural System (SINAPP) which is integrated into the Natural Protected Areas National System (SINANPE) and the Regional and Private Conservation Areas all together, consists of seventy-six natural areas and the SINANPE is constituted by sixty-two natural protected areas, from which only six are located in the coastal/marine space covering less than 1% of the national territory. The Regional and Private Conservation Areas represent less than 0.2% and solely two wetlands belonging to this category are situated in coastal areas. Furthermore, in order to entirely cover the coastal/marine ecosystems by SINANPE, the inclusion of seventeen small isles and ten peninsulas that produced guano has been proposed. This effort is designed to conserve biodiversity along the Peruvian littoral.

The establishment of the MPAs is clearly stipulated in different complementary dispositions included in the Supreme Decree Nº 038/2001/AG issued for the implementation of the Natural Protected Areas Law No. 26834.

5.3.5 Chilean Marine Protected Areas

Basically, the topographical features of the Chilean Pacific seafloor present two continuous ridges which result in many islands. The major one of these is Eastern Island, a small isle of volcanic origin. Then, constantly before the oceanic ridge reaches the continent, the elevation creates some other islands such as Salas, Gómez, San Félix, San Ambrosio and many other submarine mounts. In the Southern part of this main ridge is located the second one which is smaller and runs from West to East building the island of Robinson Crusoe and Alejandro Selkirk.

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159 The Natural Protected Areas Law No. 26834 was signed in Lima (Peru) on 30.06.1997. The Supreme Decree Nº 038/2001/AG was signed in Lima (Peru) on 26.07.2001. Regarding the latter, Article 65 mentions the State shall promote the establishment of Natural Protected Areas belonging to the SINANPE in coastal/marine and islanding zones in order to conserve the biodiversity; and, Article 67 refers to the necessity to developed a Network Strategy for Natural Protected Areas. 

160 Ibid.

161 F. Tognelli, C. Silva-García, Fabio Labra, and Pablo Marquet (August 2005). Priority areas for the
The Chilean national attention is focused on five zones connected to the most relevant oceanic masses, as follows: Humboldt Current, Cape Horn Current, Subtropical Pacific Ocean and Oceanic Islands, Sub Antarctic Pacific Ocean, and Antarctic Zone. Conversely and from a biogeographic perspective the country recognizes the following three provinces: (a) South Pacific Mesothermal Warm Province with three ecoregions: Humboldt, Central Chile and Araucana; (b) South American Mesothermal Cold with two ecoregions: Chileans, Channels and Fiords belonging to the South of Chile; and (c) Juan Fernandez and the Islands of Misadventure.\textsuperscript{162}

Summarizing the chapter, MPAs are important tools for the protection of marine biodiversity contained in every particular coastal/marine ecosystem and concurrently facilitate the management of the living resources and secure sustainable fishing, since they play the role of nursery grounds that guarantee breeding and growth of many species in their earlier stages. With this in mind, the management of MPAs should be seen from a regional perspective as many HMS enjoy the benefits for shelter and feeding that take place in these areas. These species will be harvested later on waters or national jurisdiction of neighbouring countries or on the high seas in the SEPR.

In this regard, and although UNEP through its RSP for the South Pacific is carrying out an important programme on MPAs in the region as a response to the Protocol for the Conservation and Administration for the Coastal/Marine Protected Areas, this programme and related projects should be performed in an integrated approach in connection and cooperation of other regional organizations and with more participation of national scientific institutions in the SEPR. In this concern, what really makes sense for establish a MPA is the real control that a State has on the activities developed on it. Then, integrated programme will increase this control protecting their environment and ecosystems.

For instance, in the Galapagos Islands many vessels use to fish because of lack of sufficient surveillance, and even though the record of these prohibited activities are

\textsuperscript{162}Ibid.
taken by scientists under the On-board Observer Programme carried out by IATTC, this information is not shared because of the lack of integrated programmes, agreements and cooperation between RFMOs in the SEPR and SPs. As a result, masters onboard fishing vessels just take advantage of this and harvest the richness of marine biodiversity found in this MPA without being noticed.

Correspondingly, MPAs have richness in biodiversity and marine genetic resources (MGR) that must be protected in the SEPR. For this reason, a short chapter in this respect has been proposed with the aim of getting an approach of some of the most general aspects, since this is a new topic still in process to be clarified from both legal and scientific perspective.
CHAPTER 6 MARINE GENETIC RESOURCES

6.1 Introduction

In a straight line, marine genetic resources (MGR), both inside and further than territorial waters, have increasingly been the centre of international discussions regarding access and benefit. This debate has involved the CBD, the ISA, the UNICPOLOS, the UNGA/OLOS and as a result of these deliberations, the recently created “Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction” (UNICPOLOS/MBWG). Moreover, the Working Group is operating in the support for the establishment of marine protected areas (MPAs) and in the regulation of mineral prospecting processes at hydrothermal vent locations.

Fundamentally, the functions of the WG/MB/BNJ are related to examine the systematic, technological, financial, lawful, ecological, socio-economic and other features; to identify key concerns and inquiries where much broader background studies would make possible contemplation by States of these issues; and, to indicate, where suitable, potential options and approaches to encourage global cooperation and coordination for the protection and sustainable exploitation of biodiversity in the high seas, among other duties.

For introductory purposes, the next step before getting the MGR will be approaching marine bioprospecting, which has been roughly defined as the exploration for biomolecules and distinctive bioactive components from marine resources with

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163 See UNGA/OLOS Sixtieth Session Report Number A/60/63/Add.1, which was issued on 15.07.2005. In this respect, the UNGA/OLOS adopted the Resolution 59/24 on 17.11.2004. Accordingly, Paragraph 73 of which the Assembly decided to establish the UNICPOLOS/MBWG.

164 Ibid. Sixtieth Session Report Number A/60/63/Add.1, p. 4.
potential commercial applications. Then in a few words, biomolecules and distinctive components are embedded in living marine resources, which have their own bio-features or biodiversity.

This clarification leads to the following step: the CBD\textsuperscript{166}, and to what is relevant to the MGR on it. In addition to that my views stated in Chapter I of this paper, it is worth mentioning two further points. Firstly, the consideration of the sustainable use of components of MBD, whose main principles refer to the integration of conservation and sustainable use of biological resources into national decision-making; the adoption of measures to reduce negative impacts on marine biodiversity; and, the encouragement of cooperation between public and private sectors in developing techniques for the sustainable exploitation of marine biological resources; as a whole and applied to the oceans\textsuperscript{167}.

Further, and much more specifically, the access to MGR, whose directives are as follows: (a) the authority to determine access to MGR shall be national governments and subjected to national legislation; (b) the conditions shall be created to facilitate access to MGR for environmentally sound uses without major restrictions; (c) access, where granted, shall be on mutually agreed terms; (d) access to MGR shall be subjected to the prior informed consent of the CP providing such resources; (e) each CP shall endeavour to develop and carry out scientific research based on MGR provided by other CPs; (g) each CP shall take legislative and administrative measures in accordance with the aim of allocating in a fair and equitable manner the outcomes of research on MGR; as a general approach to MGR at sea\textsuperscript{168}.

The first statements assembled by the WG/MB/BNJ were related to the worldwide understanding that the MGRs beyond areas of national jurisdiction are part of the common heritage of mankind, as stated by UNCLOS\textsuperscript{169}. In the Part XI of the Law of

\begin{flushleft}
\textsuperscript{166} See NOFIMA (2009): Research on aquaculture and fisheries. The Norwegian Institute of Food, Fisheries and Aquaculture Research. Oslo, Norway. \\
\textsuperscript{166} The CBD was concluded and opened to signature at the Earth Summit in Rio de Janeiro (Brazil) on 05.06.1992 and entered into force on 29.12.1993. \\
\textsuperscript{167} See CBD. Article 10 Sustainable Use of components of biological Diversity. \\
\textsuperscript{168} ibid. \\
\textsuperscript{169} Specifically UNCLOS: Part XI The Area, Section 2. Principles Governing the Area.
\end{flushleft}
the Sea Convention it is cited that the activities in the Area shall be carried out for the benefit of mankind and particular consideration shall be given to the interests and needs of developing States in the essence of preservation for future generations, among other complementary issues. Then, a vital mutual assistance is required to consider new improved lawful instruments on how to address MGR in the Area, accessing their use and sharing their benefits in an equitable scheme\textsuperscript{170}.

Conversely, the WG/MB/BNJ reiterated that some others delegations at the meetings linked the possible measures taken in relation with MGR in areas beyond national jurisdiction must be consistent with international law. In fact, these resources are covered by the regime of freedom of the high seas, particularly marine scientific research, where there is no need for a new regime to address the exploitation of MGR, since the mandate might be expanded to the ISA\textsuperscript{171}.

In summary, it was appreciated by the WG/MB/BNJ, from the majority of representatives, the requirement of a broader understanding of MGR issues before developing lawful, strategies and institutional alternatives that might commit States outside their own knowledge. Consequently, the obedience to current obligations, in particular regarding MSR and the protection of the marine environment, will be essential to development guiding principles, codes of conduct and impact assessments. This statement really connects the topic of MGR to a regional examination to be incorporated by RFMOs, which is not an easy task, at least for the SEPR.

As a step forward, during the Sixth Meeting of the Conference of the Parties (COP) of the CBD, the “Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization” (BG/MGR), were adopted by COP 6 Decision VI/24.


\textsuperscript{171} Ibid. p. 19.
The Guidelines are a useful evolutionary route towards the implementation of the relevant provisions of the CBD regarding the access to MGR and benefit-sharing.\textsuperscript{172} The BG/MGR\textsuperscript{173} has as its main objectives, the access and guidance by CPs to MGR, ensuring the fair and equitable sharing of benefits, along with the conservation and sustainable use of biological diversity; and the assistance in capacity/building that assures valuable negotiation and operation of access and benefit-sharing engagements and the promotion consciousness on the implementation of relevant provisions of CBD, in particular to developing countries.\textsuperscript{174}

### 6.2 Marine Scientific Research

At this point, the approach to MGR will take one proposed path, from many settled by different countries,\textsuperscript{175} this is the marine scientific research MSR. Under UNCLOS, the significant provisions dealing with MSR are referred to in Part XIII where it is expressed that all States, including landlocked countries as a general principle, have the right to carry out MSR subject to the privileges and obligations with other States.\textsuperscript{176}

Also, general principles have been broadly set out for its conduct such as the rule of peaceful purposes; the compatibility of appropriate scientific methods and means with UNCLOS and therefore with the protection of the marine environment; and, without obstruction to others uses of the sea.\textsuperscript{177}

To complement this foreword on MSR under Law of the Sea Convention, perhaps it would be simply missing the subject matter regarding international cooperation and favourable conditions. As it is considered to be a linking point for the SEPR at the

\textsuperscript{172} See CBD (2002): COP 6 Decision VI/24 Access and benefit/sharing as related to genetic resources.

\textsuperscript{173} The BG/MGR was adopted by Annex I of the UNEP/CBD/COP/6/20, held in The Hague, The Netherlands from 07.04.2002 to 19.04.2002.


\textsuperscript{175} UCW: The topic of MGR is considered very much complex deserving to be observed from different perspectives.

\textsuperscript{176} Specifically UNCLOS, Part XIII Marine Scientific Research, Section 1 General Provisions, Article 238 Right to conduct marine scientific research.

\textsuperscript{177} Ibid. Article 240 General principles for the conduct of marine scientific research.
regional level, these topics will be included further on. Complementarily, in the SEPR\textsuperscript{178} the five States are party of the CBD.

Concluding the chapter, it is observed that both MGR and MSR are relatively new subjects that need to be studied in more detail and the best way is participating in the meetings that the UNICPOLOS/MBWG is holding at least twice a year. Additionally, a regional working group for the SEPR should be organized with experts from the national marine research institutions of the SPs of the CPPS. The annual results of this working group could be disseminate at the regional and international level. Then, these results might be integrated with legal aspects permitting their implementation in the region in the short and midterm.

Finally, in order to provide support to this proposed working group on MGR and MSR, this group should be attached to a specific regional programme in this concern. This programme and working group should take into consideration both waters of national jurisdiction and beyond since many activities involving SPs take place on the high seas.

\textsuperscript{178} The SEPR’s States ratified the CBD as follows: Chile on 09.09.1994; Peru on 07.06.1993; Ecuador on 23.02.1993; Colombia on 28.11.1994; and Panama on 17.01.1995.
CONCLUSIONS

The programmes developed by international organizations under United Nations system like UNEP, IMO and FAO, within others, provide the basis and support for the enlargement of projects regarding marine biodiversity protection at the regional level in the SEPR. In this concern, it has to be taken into account that all the threats have not still been clearly identified and many others are just being ignored, since they link to sensitive issues for the States in the region, like the implementation of some IMO conventions and FAO agreements.

In this connection, it is concerned that only two countries in the SEPR have ratified UNCLOS, when there are currently 159 SPs worldwide. In fact, it is appreciated the lack of real applicable policies and their national enforcement that might somehow replace the Law of the Sea Convention in relation with marine biodiversity protection. Similarly, several other fisheries agreements still remain unnoticed and they deserved to be studied for the benefits that their implementation would bring to the protection of marine ecosystems. For instance, the FSA that has only been recently ratified by Panama and would really play a fundamental role in the regulation of FADs in some fisheries in the region.

Maritime policies should be implemented taking into account the widest picture involving all stakeholders for every particular area and activity that involves or affects the marine environment and the sustainable use of marine resources in each of the SEPR States. In addition, national policies should be consistent and connected to the regional organizations and the programmes they develop. In doing so, concerted domestic planning, integration and adaptation of other related public strategies must be considered in an integrated approach in the short, medium and long-term.
Although the London Convention on Dumping at Sea has been ratified only by Panama, Peru and Chile, the "precautionary approach" and the "polluter pays principle" should be incorporated into national maritime policies of all SEPR States. The implementation of these strategies would substantially minimize the amount of waste dump annually at sea by all kind of ships.

In this regard, since tuna fishing vessels in the SEPR have to be at sea for a few months until the cargo is completed, they usually carry oil in wells used later for freezing the fish. This practice is not a matter of concern as wells are efficiently cleaned and will not affect the quality of fishing products. Nevertheless, the danger to the marine environment raises when these kind of vessels find earlier than expected sufficient schools of YFT and/or SKJ to fill their wells. As a result, the excess oil has to be dumped at sea and the wells have to be cleaned in order to pack the tunas.

In fact, some measures might be taken to minimize this damage. For instance, they might transfer the remaining oil to other vessels in the area, or simply carry less oil in wells, particularly in high fishing seasons. This is exactly the place to enforce the "polluter pays principle" cited in the Protocol of the London Convention on Dumping at Sea. With this principle in mind, masters and chief engineers on board will look for alternatives before they decide themselves on the easiest option: fish on the port side and pollute on the starboard, simultaneously.

At this stage, cooperation and implementation of programmes between regional organizations in the SEPR would become an essential tool for controlling marine pollution, overfishing and protection of other living marine resources. Then, the On-board Observer Programme which is implemented by IATTC, in accordance to the AIDCP in the EPO, and takes observers at sea for collecting all relevant data and information on the fishing activities of the vessel and writing reports in this concern, should be carried out jointly with the CPPS in the SEPR for gathering information as well on marine pollution in relation with IMO conventions that have been ratified for the SPs or their national maritime legislation. This proposal would be possible only
with the support and approval of the SPs of both RFMOs in the geographical area they shared in the SEPR.

In summary, the exercise of this dissertation has demonstrated that if there is a path to continue improving the protection of the marine biodiversity in the SEPR in a globalized world, it is in the route of integration and cooperation. Integration between regional organizations and these with SPs. Wider agreements with specific tasks are needed. These agreements would allow the management of many environmental problems in the same place. For instance, the management of marine pollution, overfishing and depletion of non-commercial living marine resources, and protection of MPs should be visualized under a detailed integrated agreement and programme for a specific commercial activity.

In this concern, the starting point would be the creation of instruments and mechanisms that permit collect complementary information and data in relation with the environmental problems considered for the SEPR, and a very important aim as well to share them between other regional organizations and national institutions. Consequently, the proposal, study and promotion of these mechanisms are in the hands of international organizations rather than at the regional level.

Finally, this dissertation has been developed in good faith as a contribution for a broader regional integration, understanding and cooperation in the protection of coastal/marine environment and biodiversity and preservation and sustainable use of living marine resources and ecosystems in the SEPR.
REFERENCES


Chilean Fisheries Research and Development Institute. http://www.inia.cl/link.cgi/


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IMO. International Maritime Organization.  
http://www.imo.org/


IUCN. International Union for Conservation of Nature.  
http://www.iucn.org/


http://overfishing.org/


Pew Oceans Commission
http://www.seagrantfish.lsu.edu/pdfs/pewoceanrpt.pdf


SPC. Secretariat of the Pacific Community. Oceanic Fisheries Programme. http://www.spc.int/oceanfish/


### ANNEX I

**ABBREVIATIONS**

**IMO ENVIRONMENTAL CONVENTIONS**

<table>
<thead>
<tr>
<th>Convention/Protocol</th>
<th>Description</th>
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<tr>
<td>Salvage Convention</td>
<td>International Convention on Salvage, 1989</td>
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<tr>
<td>HNS Protocol</td>
<td>Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (HNS Protocol)</td>
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<tr>
<td>Anti/Fouling Convention</td>
<td>International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001</td>
</tr>
<tr>
<td>Ballast Convention</td>
<td>International Convention for the Control and Management of Ships' Ballast Water and Sediments</td>
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ANNEX II

BASIC AND COMPLEMENTARY INFORMATION SEPR STATES

PANAMA
Total Population 2,940,000
GDP (current US$) 12,295,799,808
Maritime Claims
Territorial Sea 12 NM
Contiguous Zone 24 NM
Exclusive Economic Zone 200 NM
Length of Coastline 2,490 Km
Marine Protected Areas
✓ Isla Coiba
✓ Refugio de Vida Silvestre Golfo de Montijo
✓ Refugio de Vida Silvestre Isla Iguana
✓ Refugio de Vida Silvestre Isla Taboga
✓ Parque Nacional Sarigua
✓ Parque Nacional Cerro Holla

COLOMBIA
Total Population 43,733,000
GDP (current US$) 80,925,073,408
Maritime Claims
Territorial Sea 12 NM
Continental Shelf 200-m depth or to the depth of exploitation
Exclusive Economic Zone 200 NM (CIA 2004)
Length of Coastline: 1,448 km
Marine Protected Areas
✓ Parque Nacional Natural Isla Gorgona
✓ Parque Nacional Natural Utria
✓ Parque Nacional Sanquianga
✓ Malpelo Marine Sanctuary for Flora and Fauna
ECUADOR
Total Population 12,818,000
GDP (current US$) 24,310,999,040

Maritime Claims
Territorial Sea 200 NM
Continental Shelf 100 NM from 2,500 metre isobath
Length of Coastline 2,237 Km

Marine Protected Areas
- Reserva de Recursos Marinos Galápagos
- Santuario de Ballenas de Galápagos
- Parque Nacional Machalilla
- Reserva Ecologica Manglares-Churute

PERU
Total Population 26,749,000
GDP (current US$) 56,517,062,656

Maritime Claims:
Territorial Sea 200 NM
Continental Shelf 200 NM
Length of Coastline 2,414 Km

Marine Protected Areas
- Parque Nacional Paracas
- Zona de Reserva Punta San Juan
- Santuario Nacional de los Manglares de Tumbes: (2,972 hectares)
- Santuario Nacional de las Lagunas de Mejía: (690 hectares)
- Zona de Reserva de los Pantanos de Villa: (396 hectares).

CHILE
Total Population 15,589,000
GDP (current US$) 64,153,380,000

Maritime Claims:
Territorial Sea 12 NM
Continental Shelf 200/350 NM
Contiguous Zone 24 NM
Exclusive Economic Zone 200 NM
Length of Coastline 6,435 Km

**Coastal Protected Areas**

- Parque Nacional Pan de Azúcar
- Parque Nacional Bosque Fray Jorge
- Parque Nacional Archipelago Juan Fernández
- Parque Nacional Chiloé
- Parque Nacional Laguna San Rafael
- Parque Nacional Bernardo O'Higgins
- Parque Nacional Isla Guanblin
- Parque Nacional Isla Magdalena
- Parque Nacional Alberto de Agostini
- Parque Nacional Cabo de Hornos
- Reserva Nacional Pinguino Humboldt
- Reserva Nacional Laguna Torca
- Reserva Nacional Katalalixar
- Reserva Nacional Isla Mocha
- Reserva Nacional Las Guaitecas
- Reserva Nacional Alacalufes
- Monumento Natural La Portada
- Monumento Natural Cachagua
- Monumento Natural Cinco Hermanas