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WORLD MARITIME UNIVERSITY  
Malmö, Sweden

ADMINISTRATIVE CONSIDERATIONS FOR EFFECTIVE  
MARINE ENVIRONMENTAL PROTECTION IN  
ECUADOR

by

JORGE PEREZ PAREDES

ECUADOR

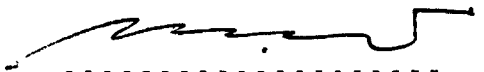
A dissertation submitted to the World Maritime  
University in partial fulfilment of the  
requirements for the award of the

DEGREE OF MASTER OF SCIENCE  
IN  
GENERAL MARITIME ADMINISTRATION


Year of Graduation  
1993

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

The contents of this dissertation reflect my personal views and are not necessarily endorsed by the University.

  
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DEDICATION

To my wife Sonia, my son Pablo  
and my daughter María Verónica

## A B S T R A C T

The purpose of this dissertation is to suggest some measures to improve marine environment protection in Ecuador within the scope of the maritime administration and its interrelationships with other national and international organisations which deal with maritime matters related to preservation of the natural conditions of the oceans.

Since the Industrial Revolution human activities have steadily increased upon the oceans principally in areas concerned with shipping, and industrial processes in the coastal zones. As a result, levels of pollution have created many problems within the oceans affecting the integrity of the marine environment in general and the living resources in particular.

Given the fact that the Maritime Administration has responsibilities not only in shipping matters, but in regulatory functions concerning the control of marine pollution, the study emphasize the importance of such functions.

This allows adjustment of the organizational structure to be visualized which will permit the administration to effectively participate in the field of marine environment protection.

Beside these organizational aspects it is important to consider the ways in which the maritime administration can achieve better results in its efforts to maintain the integrity of the marine and coastal areas.

To achieve the foregoing purposes, the following chapters have been developed:

Chapter I deals with general considerations about the marine environment, the importance of the oceans, the principal problems which affect the marine and coastal areas, and the most relevant international efforts that have been made for ensuring effective protection of these areas.

Chapter II deals with principal features of the marine environment in Ecuador, the present condition concerning legislative aspects and organisations that have responsibilities for controlling maritime activities. In addition, some problems and limitations which affect the marine environment or could influence it in the future are analyzed.

Chapter III deals with the functions of the Maritime Administration in connection with preservation of the marine environment. It also analyses the Maritime Administration of Ecuador and other specific countries in order to visualize the manner how they face maritime environmental issues.

Chapter IV, based on the foregoing considerations, deals with suggested measures to achieve effective performance of the Ecuadorian Maritime Authority as regards its responsibilities in the field of protection of the marine environment. Five relevant areas have been chosen for grouping the suggested measures. They are related to administrative, educational and coastal zone management aspects; availability of resources and international co-operation.

Finally, Chapter V deals with the conclusions and recommendations aimed at the proposal of measures that will influence the improvement of marine environment protection and mechanisms for their implementation.

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## INTRODUCTION

When I started my course at the World Maritime University I began to think about the maritime topic that could be interesting to research in order to fulfil the academic requirements and to contribute my ideas and suggestions to the improvement of the performance of the maritime administration of my home country. Among many choices, such as maritime policy, the sea uses and their problems, the public awareness on maritime matters, and the organisational framework dealing with maritime affairs, my interest was focused on an important aspect that generally has not been given the proper attention and priority in countries with limited economic resources, where the daily needs of the population are essential elements to consider in the development of national plans. This outlook is related to the marine environment and the need to protect it with appropriate measures which the maritime administration can carry out.

With an adequate organisational framework the Maritime Administration can participate in the regulatory and control processes to avoid or at least diminish the risks of degradation of the marine and coastal areas. During the lectures, seminars, visits and other academic activities which have dealt with maritime affairs I have understood that at global and regional levels important efforts are being made to ensure the integrity of the oceans and that the implementation of the "Sustainable Development" concept has direct implications with the measures that a state should take to protect the marine environment.

As an international recognition of these interrelationships, it is relevant to mention the Principle 25 of the Rio Declaration adopted in the UN Conference on Environment and Development, held in Rio de Janeiro, Brazil June 1992. This established that:

"The peace, the development and the protection of the environment are interdependent and inseparable".

To visualize the importance of this study it is necessary to understand that since the beginning of the Industrial Revolution the problems of pollution over the world have been affecting the natural conditions of the environment due, principally, to the increased human activities in different industrialized processes and in the development of new methods of transportation through the land and the sea. This has produced a great deal of solid and liquid wastes and contaminant gases which have spread over the world. Consequently, some land and marine areas, rivers and atmosphere sectors have been polluted so that the risks to living resources have steadily incremented. The process of pollution has continued through the years but has been more notorious during the last 50 years when industrialization reached high levels of productivity and the need to move raw materials, semiprocessed and final products increased the demand for maritime transport. This meant more ships and traffic over the oceans and, as a result, the levels of marine pollution have risen. In addition to such maritime activities, irrational use of the coastal zone, pollution of the sea from land-based sources and ship casualties have negatively influenced the natural conditions of the marine environment. Thus, in some regions the degradation of the physical characteristics of the sea water is affecting the living resources. Consequently, the quality and quantity of sea products for human necessities can suffer undesirable

alterations and limitations. For these reasons countries must be conscientious about the problems that affect the marine environment and should encourage actions to protect its integrity.

As a student at WMU where maritime matters are dealt with thoroughly, I am motivated in developing this study to co-operate with the national efforts towards and adequate protection of our territorial sea and its resources which provide significant support for the Ecuadorian population.

In this context the main objectives of this dissertation through the different chapters can be summarized as follows:

To emphasize the importance of the oceans and to strengthen the awareness of the principal factors which affect the marine environment and the international efforts that have been undertaken in the field of its protection

To highlight the principal features of the Ecuadorian marine environment and to assess problems and limitations that actually exist

To evaluate the role that the maritime administrations should play in addressing concerns for marine environmental protection

To suggest practical measures to achieve effective performance of the Ecuadorian Maritime Authority as regard its responsibilities in the field of protection of the marine environment.

## ACRONYMS LIST

GESAMP	Group of Experts on the Scientific Aspects of Marine Pollution
IMO	International Maritime Organisation
MARPOL	International Convention for the Prevention of Pollution from Ships
NM	Nautical Miles
OPRC	International Convention on Oil Pollution Preparedness, Response and Co-operation
SOLAS	International Convention for Safety of Life at Sea
STCW	International Convention on Standards and Training, Certification and Watchkeeping for Seafarers

UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
USAID	United States Agency for International Development

#### Spanish Acronyms

CLIRSEN	Integrated Survey Centre by Remote Sensors for Natural Resources
CPPS	Permanent Commission of the South Pacific
DIGEIM	General Directorate of Maritime Interests <i>AFFAIRS</i>

DIGMER	General Directorate of Merchant Marine and Littoral (Ecuadorian Maritime Authority)
DIGEMA	General Directorate of Environment
DINAF	The Forestal National Directorate
GDMM	General Directorate of Merchant Marine (Spain)
INOCAR	Oceanographic Institute of the Ecuadorian Navy
IGM	Military Geographic Institute
IEOS	Ecuadorian Institute for Sanitary Works
INHERI	Ecuadorian Institute for Hydraulic Resources
INGALA	National Institute for the Galápagos
PMRC	Programme for Managing Coastal Resources

ROCRAM

Operative Network for Regional Co-  
operation among Maritime Authorities  
(Latin America)

SPNG

Galápagos National Parks Service

## CHAPTER I

### GENERAL CONSIDERATIONS ON THE MARINE ENVIRONMENT

The purpose of this chapter is to emphasize the growing importance of the oceans and to strengthen the awareness of the principal factors which affect the marine and coastal areas, and the international efforts that have been taken to ensure the preservation of the marine environment. To become more familiar with the marine scenario and its actual situation is a real necessity to conceive adequate administrative measures for the management of maritime affairs and their effective implementation.

#### 1.1 IMPORTANCE OF THE OCEANS AND COASTAL ZONES

With clear and sound awareness the World Commission on Environment and Development established in its Report in 1987 the following statements related to the importance of the oceans:<sup>1</sup>

In the Earth's wheel of life the Oceans provide the balance...

They play a critical role in maintaining its life-support systems, in moderating its climate and in sustaining animals and plants, including minute, oxygen-producing phytoplankton.

They provide protein; transportation, energy, employment, recreation, and other economic, social,



and cultural activities...

The oceans are marked by a fundamental unity from which there is no escape. Interconnected cycles of energy, climate, marine living resources, and human activities move through coastal waters, regional seas, and the closed oceans.

These relevant assertions highlight the decisive role that the oceans play in the world as a potential source of living resources to satisfy the growing human needs for food and as natural element to develop maritime transport which in turn facilitates the world's trade. Additionally, the great influence that the oceans have on the climatic conditions and on several biogeochemical processes should be recognized. In fact, there are several interactions between the oceans and the coastal zones for which their respective ecosystems are intimately linked. For this reason the socio-economic development of the coastal areas are determined to a large extension by the conditions created by the proximity of the oceans.

It should be emphasized that the largest part of commercially exploitable marine living and animal resources are located in near-shore maritime areas. Consequently, a great deal of human activities have been concentrated in coastal and near-shore areas due to the advantages that they offer. A variety of industries have develop along the coasts, such as fisheries, recreational centers and mineral exploitation; in the near shore area there are an intensive interest for developing the oil industry and the mariculture.

In this context it is possible to affirm that the marine environment is a complex system controlled by a variety of physical, chemical and biological processes where the properties of the sea water are crucial to the survival of the living resources. Hence, the understanding and the continuous studies of the interrelationships among the different components of the marine environment is a prerequisite of any consideration concerning its evaluation and further identification of the problems which can arise due to the potential impacts from man's activity. If an appropriate assessment of the marine environment is made then rational and adequate systems of management can be applied in order to implement the best measures to protect and preserve the large variety of the natural resources which potentially exist in the world's oceans.

Additionally, public awareness about the nature, extent and implications of the problems of the marine and coastal environment needs to be considerably increased in order to ensure an adequate and rational utilization of the marine resources.

To be consequent with the real importance of the oceans an effective protection of the marine environment is mandatory. This can only be reached through an ample co-operation between the sea's users and the national and international organizations which are directly involved in maritime administration and in matters related to preservation of the ocean's integrity.

(-)

## 1.2 RELEVANT FACTORS AFFECTING THE MARINE ENVIRONMENT

In this section the relevant factors which have significant influence in the marine environment will be treated with the purpose to emphasize their magnitude and their incidence in the natural equilibrium of the oceans. First of all it is necessary to recognize that the combination of the continuous and accelerated growth of the world population and the development of modern technologies have resulted in a rapid increase of human activity over the land and oceans.

The exploitation of natural resources, the development of the industrial processes and consequently the growth of world trade have been the cause for which the uses of the sea have increased with the respective risks to the integrity of the marine environment.

Additionally, there are some atmospheric alterations derived from human activity that in the future could produce global or local effects over the oceans because there is a close interrelation between the meteorological phenomena and the natural condition of the seas.

The most significative areas to be discussed are: marine pollution, some meteorological aspects due to emission of gases from the Earth, and the irrational exploitation of living resources which could affect the equilibrium of the marine environment.

### 1.2.1 (†) The pollution of the marine environment

#### a. Definition

The United Nations Convention on the Law of the Sea in its Article 1 establishes the definition of marine pollution as follows:

"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."

Implicit in this definition is the concept that there is a distinction between contamination, in which concentrations of a substance are elevated above natural levels without measurable effect, and pollution, in which concentrations are elevated to the point that harmful effects may be observed. This distinction is important to consider in order to assess the seriousness of a problem and consequently to implement a reasonable legal control.

#### b. Main sources of marine pollution

According to GESAMP (Group of Experts on the Scientific Aspects of Marine Pollution) the relative contribution of different human activities to marine pollution is as follows:<sup>2</sup>

Run-off and land-based discharges	44%
Atmosphere	33%
Maritime transportation	12%
Dumping	10%
Offshore production	1%

These figures show that around three quarters of marine pollution comes directly from land, whether by water or air, but principally through rivers, pipelines and outfalls.

The other quarter is related to shipping and waste disposal at sea. In this context it is a significant fact that the pollution from land-based sources is at present the single most important threat to the marine environment and consequently it constitutes an interference to the use and sustainable development of the oceans and coastal areas.

Hence, the maritime administration of a country should participate in the attempt to control the negative influence of the land-based sources located near the coastal line, in addition to its primary responsibilities to regulate and control shipping activities and offshore operations. Of course, it is necessary to have effective co-ordination and co-operation with national organizations which directly deal with industry, agriculture and other activities that are located in coastal areas.

### **c. The most important marine pollutants**

Among the ample variety of substances that enter the oceans from different sources it is necessary to distinguish those that can constitute potential pollutants when retained in the sea water in significative quantities. In this way it is possible to

summarize the major marine pollutant with a brief comment, as follows:

Petroleum hydrocarbons which include crude oil and some of its refined products

Sewage, that may contain some noxious chemicals but its effects are generally local

Metals, particularly mercury, cadmium and lead

Pesticides and other persistent organic chemicals which include substances as the pesticide DDT and the PCBs (used in electrical apparatus)

Radioactive materials derived from natural sources in the atmosphere and the earth (added to this natural radioactivity there is a mixture of artificial radioactive substances derived from man's activity in this field)

Other important pollutants which do not fit in the foregoing categories include solid wastes (industrial wastes and dredged spoils) and garbage (particularly plastics and fishing nets)

In the next paragraph the influence of oil pollution will be discussed taking into account that it is one of the most important substances that is utilized for industrial processes in the whole world and the fact that approximately half of the global production of crude oil is transported by sea.

d. The pollution by oil

Oil is not a single substance but a complex mixture of many individual chemicals. Hence its significant properties, such as toxicity, solubility, and viscosity vary considerably from one to another, making the task of predicting effects very difficult. For this reason it is necessary to know the characteristics of an oil spill to take the appropriate measures to diminish its noxious influence in the marine environment.

The following table, used by the European Community as a reference to evaluate the effects of different types of oil in the marine environment, gives a general idea on the behavior of an oil spill.

TABLE 1. Classification of oils based on general properties which influence their ecological impact.

Type of oil	Volatility	Solubility in water	Natural dispersion	Response to dispersants	Stickiness	Biological harmfulness
<b>I Light volatile</b>	High	High	Easily disperses	Responds very well	Not sticky	Highly toxic
<b>II Moderate heavy</b>	Up to 50% can evaporate	Moderate	Some components disperse	Responds early on	Slightly to moderately sticky	Variable toxicity
<b>III Heavy oils</b>	< 20% can evaporate	Low	Little dispersion	With difficulty	Very	Smothering, clogging
<b>IV Residual</b>	Non volatile	Very low	No dispersion	Not at all	Very sticky to solid	Smothering, low toxicity

To have an idea about the principal sources that can produce pollution by hydrocarbons in the marine environment, the next rank can be established according to the following approximated percentage:<sup>3</sup>

- Industrial discharges and urban drain (37 %)
- Vessels operations (30%)
- Tanker accidents (12%)
- Atmosphere (9%)
- Natural sources (7%)
- Offshore operations (exploration and exploitation 2%)

The activities related to shipping together cover approximately 40 per cent of the total with a tendency to diminish due to the implementation of safety measures derived from international conventions on marine environment protection.

In relation to maritime disasters, to appreciate the magnitude of the marine pollution by oil spill from ships, it is convenient to summarize the principal tanker accidents since the sixties.<sup>4</sup>



✓

PRINCIPAL TANKER ACCIDENTS IN THE LAST  
DECADES

DATE	SHIP'S NAME	FLAG	PLACE	OIL SPILLED
18-III-67	TORREY CANYON	LIBERIA	Cornva_ lles (GB)	117.000 Ton.
12-V-76	URQUIOLA	SPAIN	La Coruña (Spain)	95.000 Ton.
16-III-78	AMOCO CADIZ	LIBERIA	Brest (France)	230.000 Ton.
31-XII-78	ANDROS PATRIA	GREECE	La Coruña (Spain)	50.000 Ton.
24-III-89	EXXON VALDEZ	U.S.A	Alaska (U.S.A)	42.000 Ton.
19-XII-89	KHARK V	IRAN	Atlantic Coast (North Africa)	70.000 Ton.
11-IV-91	HAVEN	CYPRUS	Genoa (Italy)	50.000 Ton.
3-XII-92	MAR EGEO	GREECE	La Coruña (Spain)	70.000 Ton.
5-I-93	BRAER	LIBERIA	Islands Shetland (Scot_ land)	85.000 Ton.

From this list it is possible to visualize the enormous quantity of oil spread in the marine area which has, logically, caused adverse effects to the natural resources of the sea, principally living resources. Depending upon the location of the accident the influence can extend to the beaches affecting coastal ecosystems and tourist areas.

International efforts have been made to avoid or diminish the incidence of these types of accidents. Through the International Maritime Organizations (IMO), many global Conventions to regulate the conditions and characteristics of tankers and to establish certain provisions related to safety measures during the navigation, have been approved.

The people involved in shipping activities should be conscious about the enforcement of the different provisions to protect the marine environment; and they should encourage the observation of safety measures to avoid marine casualties.

### **1.2.2 Meteorological phenomena**

Additionally to the influence of the atmosphere as a source of sea pollution in connection with the land-based sources, there are some meteorological phenomena that have been observed and studied during the last decades to establish their significance in the environment. These special atmospheric alterations are known as the greenhouse effect and the depletion of the ozone layer which need a general explanation in order to be aware of the possible effects on the marine environment in the near future and consequently measures to be taken to avoid the perils over the oceans.

a. The greenhouse effect is due to the increase of carbon dioxide (CO<sub>2</sub>) and other gases, such as methane, nitrous oxides and chlorofluorocarbons (CFC s) in the atmosphere as a result of human activities principally of those related to industrial processes which utilize fossil fuels (coal, oil and natural gas).

The amount of these gases in the atmosphere can increase the capacity to trap some of the radiant heat which the Earth emits after receiving solar energy from the sun; this phenomenon is somewhat similar to the capacity of greenhouse glass enclosures to trap heat. For this reason it is commonly termed the "greenhouse effect".

This condition is the principal cause by which the average temperature on Earth could rise significantly, because such gasses cause the retention of heat. As a consequence of this phenomenon higher temperatures could cause the sea level to rise and weather patterns to be disrupted.

It is estimated that global sea levels could rise from 20 to 165 cm. over the next century mainly due to thermal expansion of the oceans.<sup>2</sup>

In this condition there would be the possibility of suffering the incidence of heavy alterations of the weather and the flooding of some coastal areas.

A measure to control the quantity of CO<sub>2</sub> and other gasses that are emitted from land could be to diminish the use of fossil energy and to introduce other alternative sources of energy.

b. The depletion of the ozone layer. This layer lies between 24 and 40 Km. above the Earth's surface and constitutes an indispensable protection shield preventing ultraviolet radiation from reaching the Earth. In some parts of the atmosphere particularly over the south pole the thickness of this layer is rapidly decreasing and consequently it causes a major incidence of the ultraviolet radiation which produces adverse effects on certain plants and aquatic organisms living near the surface of the sea. It can also cause problems for human health in the form of afflictions to the skin and eyes. According to J. KALO<sup>6</sup> there is growing evidence that by the 21<sup>st</sup> century the depletion of the Earth's protective ozone layer could have devastating effects on the marine food chain and world fisheries production.

The principal cause for the depletion of the ozone layer is the influence of the chlorofluorocarbons (CFC s), which are industrial chemicals used principally for refrigeration, cooling, insulation and electronics cleaning.

The obvious measure to prevent the depletion of the ozone layer is to reduce the use of CFC s; for this reason international agreements have been achieved through the UN Convention on the Protection of the Ozone Layer (Vienna 1985) and The Montreal Protocol on Substances that deplete the Ozone Layer (1989).

Under the umbrella of these agreements it would be advisable to develop regional technical networks to study continuously the condition of the ozone layer in a co-ordinated way and provide an effective interchange of information.

### ✓ 1.2.3 Exploitation of living resources

Besides the human activities that can produce pollution in the sea, there are other uses of the sea that can affect the marine environment if no regulatory measures are taken in order to preserve the natural resources. Among these activities the exploitation of living marine resources and certain activities on the coastal area related to exploitation of mangroves in the tropical and sub-tropical zones should be mentioned.

Concerning to the exploitation of living resources it is important to consider that fishing has increased to the extent that some species of fish are threatened by overfishing.

About 70 million tons of marine fish are caught each year, and also shellfish and marine mammals such as whales and seals<sup>7</sup>. This amount has progressively increased in the last years according to the world demand of fish. For this reason a large number of stocks, especially those most valuable commercially, are fished at or beyond their sustainable yield with the utilization of modern techniques and developments such as better vessels with new gear, advanced handling and freezing facilities.

The excessive exploitation of living resources can adversely influence the natural development of the marine species; consequently, certain areas of the marine environment can lose their importance as a source of food for the population's needs.

Many efforts at global or local levels have been made during the last decades in order to rationalize fishing activities and to implement international regulations which would aid to preserve living resources.

The UN Convention on the Law of the Sea in its Part VII section 2 contains provisions related to conservation and management of the living resources of the high seas. It also establishes the rights, jurisdiction and duties of the Coastal State for the purposes of exploring and exploiting, conserving and managing the natural resources whether living or non-living (Art. 56).

Almost all maritime countries have established laws and regulations in the field of fisheries. However, fisheries management at a global level still has problems because the national interests are different from one country to another so it is difficult to achieve international agreements principally on fishing rights and quotas. Additionally, there are other causes which interfere with the management process, such as the mobility of fish and the interaction between various fishes and other marine species.

It would be advisable to achieve a global consensus about the importance of preserving marine living resources in order to implement effective measures to avoid the overexploitation, because the growing population will need in the future adequate stocks of fish to satisfy the demand for food.

In relation to exploitation of mangroves in coastal areas it is relevant to consider the importance that they have as nursery grounds and critical habitats for fish and as a direct food source for some marine species which develop near the coastal zone. Furthermore, they support the integrity of the coastal line reducing the impact of erosion. The benefits that mangroves provide are of particular interest for maintaining the integrity of coastal ecosystems.

Many human activities which develop near the coast have a considerable influence over the mangroves. Among the principal ones are the urban expansion of coastal cities, associated with development of roads, causeways, ports, dredged channels and industrial plants; another relevant activity is the continuous development of the mariculture which needs large ponds near the coastal line to have the essential elements for the productive process.

Besides these activities there is exploitation of mangroves to obtain wood for industrial processes and in some countries to employ it as elements to build houses. These human activities are causes of direct removal of mangroves which can be depleted if no regulatory measures are taken.

It will be necessary to implement adequate programs for coastal area management which permit application of effective measures for controlling human activities that can affect this important sector of the marine environment. In addition, it is advisable that the maritime policies related to development of mariculture have due consideration for the protection of mangroves.

### 1.3 INTERNATIONAL EFFORTS TO PROTECT THE MARINE ENVIRONMENT

During the last four decades the maritime world has been conscious of issues that affect the marine environment. Many efforts have been carried out to avoid, or at least diminish, the negative influence of human activities on the oceans.

The United Nations (UN), through their organizations that have functions related to maritime activities and environmental issues, such as IMO and UNEP, have instituted relevant initiatives concerning maritime safety and protection of the marine environment. These organizations have promoted global and regional meetings in order to achieve international agreements on maritime matters of common interest. In this context, many international conventions and protocols have been signed and most of them ratified. The provisions of these agreements are addressed to protect the integrity of the marine environment.

With the purpose to complement the scope of this study and to have a general overview of the principal international efforts which have direct connection with aspects related to protection of the marine environment, a description of the relevant conventions, conferences, studies, and programs which have been adopted since the decade of the fifties, is specified in Annex "A" (at the end).

However, the following considerations deserve to be highlighted in order to recognize the significance of these international agreements.



- a) The Stockholm Conference (1972) established a final document with various principles which include a general obligation of states to preserve the marine environment
- b) The MARPOL 73/78 Convention, in force since October 1983, has special interest for shipping activities because it prevents sea pollution from ships
- c) The SOLAS Convention 1974/1978, has a significant role concerning the protection of marine environment because specific chapters, related to safety of navigation and carriage of dangerous goods, are included
- d) The UNEP Regional Seas Program (1974) was developed to achieve regional agreements to face marine pollution. The regional conventions and their respective action plans provide the appropriate framework for the establishment of a suitable policy to protect the marine environment and coastal areas
- e) The UN Convention on the Law of the Sea (UNCLOS 1982) represents a major step forward an integrated management regime for the oceans. Specially, the Part XII of the Convention provides a broad outline for action concerning the prevention of marine pollution from all sources at global level. The significance of the "UNCLOS 1982" in this respect can be summarized recognizing that it is:<sup>a</sup>
  - a global legal framework for the marine environment,
  - a mechanism for accommodating ocean uses and interests,
  - a system for sustainable development,

- an instrument promoting the development and transferring of marine science and technology and
  - a model for the evolution of an international environmental law
- f) International Guidelines on the Protection of the Marine Environment Against Pollution from Land-based Sources (Montreal Guidelines 1985).  
This set of guidelines can help nations develop, international agreements and national legislation to protect the marine environment; from its provisions nations may select or adapt elements to suit their specific needs
- g) The Report of the World Commission on Environment and Development (1987) contains a deep analysis of environmental, development and peace issues. In its pages is consigned a clear concept of "sustainable development" and realistic proposals to face the critical environmental and development problems. This Report emphasizing the importance of the oceans and the necessity of their conservation
- h) The International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC-1990) provides a global framework for international co-operation in combating major incidents or threats of marine pollution
- i) The Global Program for the Protection of the Marine Environment developed by IMO contains a serie of activities aimed to identify the problems and risks that developing countries face in the field of marine environment protection

- j) The U.N Conference on Environment and Development (UNCED-92) held in Rio de Janeiro, Brazil, on June 1992.- Called the "Earth's Summit". It was the largest scale and highest level conference in the history of UN to deal with environmental problems, among them those related to marine and coastal areas. In fact, one of the approved documents, entitled Agenda 21, contains a program which specifically refers to marine environmental protection.
- k) Finally, the activities of international private organizations which deal with environmental matters, deserve special mention because in some cases their actions are related to the preservation of marine and coastal areas. The most recognized of them are Greenpeace and World Wide Fund For Nature (WWF).

It is relevant to emphasize the role that IMO, as a maritime competent international organization, plays in promoting and strengthening measures to ensure the protection of the marine environment. This organization, through its Marine Environment Protection Committee and the new Sub-committee on Flag State Implementation, carries out important efforts to create mechanisms to facilitate the implementation of the conventions and instruments. Additionally, IMO, co-operates with UNEP in developing Joint Contingency Plans within the Regional Seas Program. ✓

The regulations and recommendations derived from these international efforts are the great value for the maritime countries to implement adequate measures to adjust and improve their maritime administrations.

Of course, to achieve effective application it will be necessary to actualize and harmonize the national legal frameworks according to the common parameters established by the international community, taking into account that the problems of the oceans are closely interrelated and need to be considered as a whole.

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## CHAPTER II

### PRINCIPAL FEATURES OF THE MARINE ENVIRONMENT PROTECTION IN ECUADOR

This chapter deals with relevant aspects of the Ecuadorian maritime area in order to highlight the geographical characteristics, the actual situation on legislative matters, and the problems and limitations that exist, or potentially can arise if no protective measures are taken. The purpose is to strengthen the awareness of the Ecuadorian marine environment, to provide an adequate base with which to assess its present condition and the necessary administrative measures which could be implemented to ensure its preservation.

#### 2.1 PARTICULAR CHARACTERISTICS OF THE MARINE AND COASTAL AREAS

##### 2.1.1 The territorial sea

The Ecuadorian territorial sea (see Annex "B") is located in the south-eastern part of the Pacific Ocean, the biggest ocean in the world. The extension of the marine area is about one million square kilometers according to provisions of national law. Article 1, paragraph 5 of the Political Constitution establishes that:

"The Territory is inalienable and irreducible, it comprises that one of the Real Audiencia de Quito with the introduced modifications by the valid treaties, the adjacent islands, the Colon Archipelago or Galápagos, the territorial sea, the subsoil and the respective suprayacente space".

This article is complemented by Article 628 of the Civilian Code that relates to the National Property. The first paragraph of this article establishes that:

"The adjacent sea, until a distance of 200 nautical miles measured from the most pronounced points of the Ecuadorian continental coast and from the most separated islands of the Colon Archipelago and from the points of the lowest tide, according with the base-line that will be fixed by Executive Decree, is territorial sea and of national domain".

The Galápagos Islands are located approximately 600 NM from the mainland. These islands are internationally recognized for their particular and interesting ecological characteristics which are emphasized later.

There are other small islands near the continental coast; namely Puná, La Plata and Santa Clara, which are important reference points for navigation.

The general conditions of the sea and the weather are normally benign throughout the year; there is no strong meteorological phenomena such as hurricanes or tornados. Only when the phenomenon known as "El Niño" occurs there are notable alterations of the weather and some changes in the sea condition. This specific phenomenon materializes occasionally when warmer water appears in the first months of the year in front of the coast.

### 2.1.2 The coastal zone

The continental coast is approximately 1000 Km. in length. Its principal geographical features starting from the north are:<sup>1</sup>

- Ancon de Sardinias Bay where the Matage and Santiago rivers flow; this area is a great delta with many small islands. The coastal line is flat with few developed beaches
  
- The mouth of Esmeraldas river where the Port of Esmeraldas is located; near the coast there is a large deep named La Poza of 400 m. in depth
  
- The Atacames and Sua beaches, where extensive tourist activities have been developed
  
- The Galera Point and San Francisco Cape, characterized by cliffs
  
- The Pasado Cape, with an irregular topography and many cliffs. Nearby is the small Port of Bahía de Caraquez. To the south are Jaramijó Point and San Mateo Cape where the Port of Manta is located
  
- The San Lorenzo Cape and Santa Elena Point where La Plata island, the Ayangué bay and the ports of La Libertad and Salinas are located. The Santa Elena Point is the western most point of the Ecuadorian coast
  
- The Gulf of Guayaquil is the biggest and most important coastal inflexion where the Santa Clara and Puná Island and the Ports of Guayaquil and Port Bolívar are located. The Guayas river flows into this Gulf

- Finally, in the southern part of the coast lies the Jambelí Archipelago with many water inlets, small and low islands and mangrove forest, where mariculture has developed to a great degree.

As it can be seen the configuration of the Ecuadorian coast has a variety of geographical and hydrographic features, such as estuaries, mangrove forests and shallow waters on the Northern and Southern extremes, and ample and soft beaches in the central part. Some sections of the coast are characterized by cliffs.

The climate in the coastal zone is of tropical nature with an average temperature of 25°C and 85% of humidity. There are two typical seasons, the winter or rainy season from December to April, when the highest levels of temperature and rain are reached, and the summer season that is generally dry with moderate temperatures during the rest of the year. As mentioned earlier, the "El Niño" phenomenon can significantly influence the coastal weather conditions.

With respect to soil, it is relevant to say that in the major extension of the coast the soil is highly fertile because it is composed primarily of organic material deposited by the principal rivers which flow into the Pacific, namely Mataje, Santiago, Esmeraldas, Chone, Guayas and Jubones.

### √ 2.1.3 The Galápagos Islands

This group of islands conforms the Archipelago of Colón, located at approximately 600 NM to the west of the continental coast.



The Archipelago is composed of five major islands namely Isabela, Santa Cruz, Fernandina, San Salvador and San Cristóbal; eight small islands, 42 keys and 26 emerged rocks. The total land area covered by the archipelago is 8006 sq. Km. The major extension corresponds to the Isabela island with 4,588 sq. Km. which also has the greatest altitude on the top of the Wolf volcano at 1,707 m. The extreme points of the archipelago from South to North are separated over 414 Km., and from East to West over 268 Km.®

The islands were discovered by the Spanish Bishop, Tomas de Berlanga, on March 10, 1535 during the voyage from Panamá to Perú. Since 1831 the islands have belonged to Ecuador, and in 1972 they were included in the political division of the Republic with the name of "Province of Galápagos".

The Archipelago is of volcanic nature and have a coast line of approximately 1400 Km. Most of the islands consist of lava and have abrupt submarine gradients; it is common to find great depths near the coast.

The regional weather has similar characteristics to the continental coast, with some variations due to oceanographic and meteorological conditions of the east tropical Pacific; the "El Niño" phenomenon also has significant influence.

The wind is generally stable and the sea is relatively calm during the year. Due to its oceanic situation, the coastal line is directly exposed to the action of the waves from all sides.

The flora and fauna of the islands have special characteristics which have motivated an international interest in their study. In 1835 the English naturalist CHARLES DARWIN realized observations about certain details of the some natural species which were utilized to support his theory on species evolution described in his book "The Origin of the Species".

In 1959 the islands were declared a "National Park" and the "Charles Darwin" International Foundation was organized with a Scientific Station in Port Ayora (Santa Cruz Island). The aim of this organization is to preserve the ecology of the Galápagos that is intimately interrelated with the sea.

Because of their particularly important ecological characteristics, in 1978 the Islands were nominated by UNESCO as a "Natural World Heritage Site".

The marine environment of the Galápagos needs to be protected in order to preserve the natural species of the flora and fauna and their habitats. Therefore, it is a responsibility of the maritime administration to cooperate with other international and national organisations which are involved in scientific studies and to enforce the laws and regulations within the maritime areas.

## 2.2 LEGISLATIVE ASPECTS

It has been a constant interest of the Ecuadorian state to lay out the establishment of appropriate laws and regulations in order to prevent contamination of the environment and to control the rational use of the

national waters and their resources. Many regulations have existed since the sixties and constitute the basic instruments to deal with the problems that have arisen as a consequence of the impact of the human activities on the environment.

Different national organisations and institutions have been involved in matters related to enforcement of the legal provisions. Some of these organisations belong to the maritime administration. On the other hand, the country has been conscious of environmental issues at a global level and international efforts to protect the integrity of the environment.

In the maritime field, Ecuador is party to the principal conventions dealing with the protection of the marine environment; consequently various studies have been carried out to improve the national legislation, taking into account global regulations and recommendations which can be applied at a national level.

In the following paragraphs the principal legal instruments are summarized with a point of view addressed to the maritime aspects that are relevant for this study.

### **2.2.1 The Political Constitution**

This is the fundamental law of the country which formally states people's rights and duties. For this reason the Ecuadorian Constitution contains a title to cover the rights, duties and guaranties of the person. Specifically, Article 19 refers to the obligation to the state to ensure an adequate environment. It says:

Without prejudice of other necessary rights for the complete moral and material evolving which derives from the person's nature, the state guarantees her:

1.- ...

2.- The right to live in an environment free of contamination.

It is duty of the state to ensure that this right is not affected and to care for the preservation of the nature. The law will state the restrictions to exercise determinate rights or privileges to protect the environment.

Based on this constitutional precept the national laws, which have incidence in the maritime field, should cover aspects related to marine environment protection to ensure that the human activities can not cause damage in the marine and coastal areas. Consequently, the organisations and institutions which have responsibilities to control the maritime activities should be adequately implemented to ensure the enforcement of the law.

### 2.2.2 The Water Law

This law was established with the Decree N. 369 signed on 18 May, 1972.

Its provisions regulate the utilization of the atmospheric, sub-soil, superficial and maritime waters of the national territory. Art. 4 specifies that the bed and sub-soil of the territorial sea are national properties of public use.

Title II deals with matters related to conservation and contamination of the waters such as the prohibition of activities that can produce contamination. Additionally,

as a special disposition, Art. 103 says: "related to sea waters, it will be subject to the laws of the matter".

In general, the provisions of this law apply to the land, rivers and lakes, in order to ensure the water quality to be used for human purposes.

Indirectly, it has a relative importance in the marine area because the regulations that prohibit contamination of the waters, principally in the rivers, are significant to diminish the sea contamination in coastal zones and estuaries. However, it may be appropriate to complement this law with specific provisions which ensure the quality of the water in coastal areas due principally to the development of certain activities, such as mariculture and exploration and exploitation of minerals.

### **2.2.3 The Prevention and Control of the Environmental Contamination Law**

This law has been in force since May 26, 1976 and its provisions are addressed to the prevention and control of the environmental contamination, the protection of the soil, water and air resources; and the conservation, improvement and restoration of the environment. One of the considerations that support this law is related to the actual industrial development of the country which obligates that the environment preservation should be oriented with human sense and essentially qualitative.

For the application of this law and its regulations an Environmental Protection Interinstitutional Committee was created which has the principal function, at national level, of planning for the rational use of the soil, water and air resources, taking into account the

prevention and control of the environmental contamination. This committee is managed by the Health Minister and is integrated by other Ministers among them the Minister of Defence. Through the Ecuadorian Institute for Sanitary Works (IEOS), the Health Ministry co-ordinates the activities of the institutions which have the responsibilities to apply this law. Among these institutions an organisation of the Navy which is involved in matters related to marine affairs actually with the title of General Directorate of Maritime Interests (DIGEIM) has responsibilities concerning the prevention of contamination and control of the water quality in the marine area and navigable rivers, according to the Maritime Police Code.

To avoid contamination of marine waters, the law expressly prohibits discharge, without being subjected to the regulations and technical specifications, the residual waters which contain contaminants that are noxious for human health, the fauna and the flora. Finally, the law establishes sanctions to whom violates its provisions.

Although the spirit of this law is focussed on avoiding environmental contamination in a general way, it is relevant to consider the importance of the marine environment as an ample and valuable national region in order to precise the adequate provisions, in connection with the international regulations to ensure the protection of the Ecuadorian sea. Further, it will be necessary to actualize the legal framework taking into account the present national structure and the co-ordination mechanism that should be implemented.

#### 2.2.4 The Maritime Police Code

This Code is one of the principal instruments that the maritime authority has in order to execute its functions concerning shipping matters.

At the beginning of the seventies when the national hydrocarbon resources started to be exploited and some international agreements and conventions were established to avoid contamination of the sea by oil, the Ecuadorian government was conscious about the importance of actualizing this code with the purpose of maintaining the integrity of the national territorial sea and of cooperating with the international efforts to preserve the oceans. In effect, with the Decree 945 of 12 September, 1974 a specific section was added to the Title III of this code with the name of "The Control and Prevention of Contamination of National waters and coastals produced by hydrocarbons".

This section establishes that control of the contamination by hydrocarbons in territorial waters, coasts and beaches, rivers and navigable waterways under the jurisdiction of the maritime authority is of public interest. In general, the provisions are addressed to forbid the discharges of hydrocarbon residues in the marine waters, coastal zone and rivers, from ships or industrial plants.

In relation with the sanctions it is specified that, who contaminates the waters must pay the values that will be necessary to clean the waters and beaches.

Additionally, as an important provision it is established that the maritime authority, within its jurisdiction, must control any kind of contamination produced by other toxic substances. This fact should be considered in the

process planning of the national and local contingency plans and in the port emergency plans to deal with dangerous goods incidents which can cause damage to the marine environment.

Complementary to this Code, the Hydrocarbons Law establishes specific provisions to ensure that the exploration and exploitation operations of hydrocarbons do not cause environmental problems. Particular measures are included to be applied in the maritime and coastal areas when those operations are implemented there, with the purpose to protect the marine resources.

#### **2.2.5 The Law of fishing and fishery development**

This law has provisions addressed to manage and protect the fishery resources of the marine area, rivers, lakes and natural or artificial channels. It establishes that the rational exploitation of the fisheries will be regulated and controlled by the state according its interests. Particular regulations to control the development of the aquaculture are included. Related with the marine environment protection this law prohibits the discharge on beaches of sewage without appropriate treatment, and the destruction or alteration of mangroves. Other rules establish the basic requirements that the fishing industry must comply with in order to avoid environment contamination during the processing of fishing products.

The importance of this law is easy to deduce because it deals with matters directly related with the living resources of the sea taking into account their rational exploitation and the preservation of the marine and coastal ecosystems.



### 2.2.6 Decrees and regulations to protect the mangroves

Because Ecuador is located in the tropical zone, most of its coastal zone is covered by mangroves which play a vital function maintaining the natural conditions of the coastal ecosystems. For this reason the state through the executive decrees and ministerial regulations, has since the seventies, established the appropriate measures to avoid the indiscriminate exploitation of the mangroves, and to limit the development of large ponds utilized in aquaculture in areas covered by this important vegetal resource. The Executive Decree N:824-A signed on 5 June, 1985 prohibits the exploitation of mangrove forests. Thus, these regulations are the legal instruments to ensure the integrity of the coastal zone and its rational use. Therefore, the protection of the marine environment in this area can be ensured if the control mechanisms and the administrative co-ordination between the various organisms involved are effectively implemented.

### 2.2.7 Specific legislation related to Galàpagos Islands

Taking into account the exceptional ecological characteristics of these islands and the need to preserve its natural resources, principally the marine life and those which exist in the coastal zone, the national authorities has since the thirties been motivated to establish adequate measures to ensure the integrity of the archipelago. After the declaration as National Reserve Park and the installation of the "Charles Darwin" scientific station there were many efforts to regulate the marine environment protection by extending the area

to be considered as a reserve; this was supported by international organisations interested in actions to protect the nature and the environment.

The Ecuadorian government based on the need to protect natural areas which have ecologic, scientific, educative and economic value signed on 29 April, 1986 the Executive Decree N. 810-A to safeguard the marine resources of the Galápagos. This Decree establishes a marine resources reserve zone within a limit of 15 NM around the islands, as exclusive domain of the state. Subsequently, according provision of the same Decree, the Plan For Management the Reserve of Marine Resources of the Galápagos was elaborate and approved with the Executive Decree N. 3573 published in the Official Registry N. 994 of 6 August, 1992.

#### 2.2.8 Complementary Laws

Besides the foregoing laws there are others that have provisions to be applied in the different provinces, such as the Municipality Regimen Law which deals with environmental aspects related to the industrial activity, the net of sewage and the elimination of waste; the National Security Law that establishes the National Directorate of Civilian Defence which has functions related to prevention and control natural disasters.

As can be deduced these laws have incidence in the marine environment because the environmental problems can affect the marine and coastal areas when contaminant substances flow through the rivers or the atmosphere to the oceans, or when emergencies, such as oil spills could reach the beaches.

### 2.3 PERFORMANCE OF THE ORGANISATIONS INVOLVED

According to the legal framework actually in force in Ecuador, there are many organisations and institutions which are involved in tasks to ensure the enforcement of the different provisions in the field of preservation of the environment in general and the marine environment in particular. In the following paragraphs the principal organisations and their specific functions related to environmental issues will be summarized.

The Sub-Secretary of Environment is an important body of the Ministry of Energy and Mines. Its principal functions are related to regulating the performance of hydrocarbon exploitations and other forms of energetic exploitation, such as dams to produce electrical energy in order to optimize the control of the environmental impact of such exploitation.

The General Directorate of Merchant Marine and Littoral As a maritime authority it has the responsibility to apply the Maritime Police Code and its provisions with respect to marine contamination, and the occupation of the coastal zone until the line of the highest tide. Additionally it should intervene in the implementation of the regulations to control the development of the aquaculture in areas of its jurisdiction.

Through its internal structure and subordinated organisations, such as the Department of Prevention and Control of Contamination, and the Captainships, it carries out the control of sea contamination due principally to ships operations. This Directorate is an organism of the Ministry of Defence subordinated directly to the Ecuadorian Navy and also participates actively in the Programme to manage the Coastal Resources (PMRC).

In the next chapter its functions in this field will be analyzed with more detail.

The Hydraulic Resources Ecuadorian Institute (INHERI)

This Institute belongs to the Ministry of Agriculture and has the fundamental function to ensure the rational use and protection of the national hydraulic resources based on the Waters Law's provisions.

The General Directorate of Environment (DIGEMA)

Its principal function is related to control the enforcement of the legal provisions for the environment protection and for the preservation of the natural resources managed by the Ministry of Energy and Mines. It was created in 1984 as an operative organisations to regulate, direct, co-ordinate and control the actions concerned with environment protection.

To perform its functions this Directorate has the support of the "Control Environment and Natural Resources Agents" which are organisms that have responsibilities in the hydrocarbons, fishing and geology sectors.

The Ecuadorian Institute for Sanitary Works (IEQS)

It has the responsibility to co-ordinate the activities that are performed by various institutions related to environmental sanitation; it also exercises the control on matters concerning water contamination.

The Forestal National Directorate (DINAF)

It manages the enforcement of the Forestal Law to ensure the preservation of natural areas by preventing and controlling soil and water contamination. Its actions are important in the preservation of mangrove forests.

### The Sub-secretary of Fishing Resources

It is an important body of the Ministry of Industry, Trade, Integration and Fishing. It has the responsibility to emit the policies regulating fishing activities under the provisions of the Fishing Law. Additionally, in the fishing sector other institutions, such as The General Directorate of Fishing and The National Institute of Fishing, carry out relevant functions to control contamination, to regulate development of the aquaculture and to realize studies on marine ecosystems in order to recommend the adequate measures to avoid their degradation.

### National Institute for the Galápagos (INGALA) and Galápagos National Parks Service (SPNG)

These institutions have responsibilities concerning the development and protection of the Galápagos Islands. The Park Service has functions for protection of the island parks along with the surrounding waters, which Ecuador declared as marine reserve in 1986.

### Local organisations

The provinces and its capital cities have entities to administer the local affairs, such as the Provincial Governments, the Provincial Prefectures and the Municipalities. In the case of the coastal provinces, these institutions intervene in matters concerning environmental problems that can affect the coastal areas principally in sewage treatment and tourist activities.

### Other Navy organisations

According to the Political Constitution the Armed Forces should intervene in national security matters but also in the development process. For this reason the structure of the Navy contains some organisms directly involved in activities to strengthen the maritime power factors, such

as the Merchant Marine, Maritime Conscience, Sea Resources and Scientific studies of the marine area. The principal organisations are the General Directorate of Maritime Interests (DIGEIM) and the Navy Oceanographic Institute (INOCAR) which have active participation in promoting the importance of the sea and the need to protect it. DIGEIM, also carries out studies to analyse the legal framework and International Conventions in connection with the preservation of the marine environment.

#### Private organisations

Additionally, there are some private organisations which develop activities related to nature conservation and protection of the environment. The principal organisations are: Nature Foundation and Foundation Pedro Vicente Maldonado, the latter intervenes in the Programme For Managing Coastal Resources.

As mentioned before in Ecuador there are many ministry organisations which deal with environmental matters under the umbrella of the particular laws that give them the authority and the responsibility to manage the activities which can influence the preservation of the environment.

Among these organisations, the DIGMER, as national maritime authority, the fishing institutions, the Galápagos National Park Service and some Navy entities intervene directly in the maritime field to control the human activities related to the exploitation of marine resources and the uses of the sea in general, bearing in mind the adequate measures to ensure rational processes of exploitation and an effective preservation of the marine environment.

Taking into account these considerations it is important to recognize that, in some cases, administrative interferences are produced among the responsible organisations. Thus, the particular functions can be overlapped with a considerable waste of efforts and difficulties when applying the law. This has been more notorious in the management of the coastal zone, principally in the Galápagos Islands and in areas where the development of the mariculture has reached high levels.

For this reason it is necessary to improve the mechanisms of co-ordination.

## 2.4 PROBLEMS AND LIMITATIONS

### 2.4.1 Physical and ecological degradation of some coastal areas and increase of pollution in near shore waters

The intensive human activities along the Ecuadorian coastal zone and sometimes the disastrous effects of natural phenomena have been the cause for degradation of important sectors of the coastline and near shore water where the marine ecosystems develop.

Consequently, these areas have suffered significant changes in their natural conditions. This has been more relevant during the last three decades when the aquaculture and the industrial process for fishing products have significantly incremented because they constitute good sources of economic inputs for the population involved and for the national economy as well.

Other element that sometimes affect the coastline is the phenomenon "El Niño". Besides these causes are those produced by the rivers which carry away contaminant substances.

In the following paragraphs the most relevant aspects of the actual situation will be emphasized.

Concerning human activities first of all it should be known that almost four million of the total population of Ecuador, which is more than 10 million, are located in the coastal provinces. Most people have direct relation with activities in the coastal area.

The biggest city in the country, Guayaquil, is the principal port with near two million inhabitants, located at the margins of the Guayas River which flows into the Pacific conforming a big estuary. There are other important cities, such as Esmeraldas characterized for its oil activity, Manta for the fishing industry, and the "El Oro" Province for aquaculture; other small towns on the coast carry out intensive artisanal fishing activities, among them are Bahía de Caraquez, Salinas and Posorja.

One of the most important activities on the coast is the aquaculture to principally cultivate shrimp which is the third product in importance for exportation after oil and bananas. To develop this activity large ponds have been built in coastal areas, most in direct connection with the sea. Generally, these ponds are located in sectors which are rich in mangroves. Therefore they have suffered a continuous and systematic destruction. To have an idea about the magnitude of the aquaculture growing and mangrove depletion it is interesting to observe statistics based on studies carried out by a technical centre named "Integrated Survey Centre by Remote Sensors, for Natural Resources" (CLIRSEN), which



is an organisation of the Armed Forces subordinated to the Military Geographic Institute (IGM). The figures are shown in the following table:

CHANGES AT NATIONAL LEVEL OF MANGROVES AND PONDS FOR  
AQUACULTURE AREAS (Ha)

	1969	1984	1987	1991
MANGROVES	203625	182157	175157	162055
AQUACULTURE (SHRIMP).	0	89368	117729	145998

According to these figures approximately 20 % of the area which is cover by mangroves has reduced in 20 years but the aquaculture has had an spectacular growth of near 150 thousand hectares. If this situation continues, in the near future there will be an unbalanced exploitation of these resources. The key to achieve a rational exploitation will be to ensure the enforcement of the respective regulations through a co-ordinate action of the organisations involved, among them the maritime authority which has responsibilities to authorize the occupation of the coastal zones in the area of its jurisdiction. If an effective control is performed the protection of the marine environment in those areas will be ensured.

Related to fishing activities, which can cause environmental problems, it is relevant to mention the fact that in some coastal areas, such as Esmeraldas, Bahía de Caráquez, Manta, La Libertad, Santa Rosa, Posorja and the Jambeli archipelago, there are intensive activities of artisanal fishing. The process of managing the living resources is carry out without due carefulness. Consequently, the beaches are affected by organic and inorganic wastes.

On the coast of Manabí and Guayas Provinces many industrial plants processing fishing resources have been established. This plants utilize chemical substances that can contaminate the near shore waters and the beaches if the industrial wastes are not appropriately treated. The fishing authorities have the primary responsibilities to regulate and control these activities; the maritime authorities should co-operate to promote the preservation of beaches and near shore waters.

As the country has large and smooth beaches along the coast, particularly in the northern and central sectors, the tourist industry is in continuous development but without the necessary facilities to protect the environment. Additionally, most people do not observe the adequate carefulness to maintain the area clean. In the Galápagos Islands, where the tourist flow is increasing year by year specially by foreign citizens, environmental problems can arise in the coastal zone if it is not well organized and the control measures are not effectively implemented. By the year 1990 nearly 50 thousand tourists visited the Galápagos which is approximately ten times more than the number observed in 1970 when organized tourism began. Despite the efforts of the authorities of the Park Service and others which

have responsibilities in the islands, the strict guidelines to protect the maritime environment are constantly violated due to difficulties to exercise an effective control when there is an excessive number of visitors. It is expected that with the legal establishment of the reserve zone 15 NM around the islands, the measures to control the contamination of the beaches and near shore waters can be well implemented.

In connection with the influence of the rivers which flow into the Pacific Ocean, the level of contamination is significant in near shore waters principally in the estuaries of the Gulf of Guayaquil formed by the rivers Guayas and Jubones. This influence is also observed in the northern part of the coast where the rivers Mataje and Esmeraldas flow. Many contaminant substances, such as pesticides utilized in agriculture, industrial wastes and sewage without treatment are carried away by the rivers and enter in the ocean affecting the marine environment. Further, these substances can affect the aquaculture.

Concerning the natural phenomena, the disastrous consequences produced by "El Niño" should be emphasized. In 1983 there was a catastrophic situation due to heavy rains produced by this warm marine current over the coastal zone. Some beaches and areas of mangroves with their interrelated marine ecosystems suffered considerable alterations.

Although they are not yet observed, there are other kinds of conditions, such as the "greenhouse effect" and the "depletion of the ozone layer" which could affect the ocean as a whole or the coastal zone in particular due to increasing of sea temperature and rising of the water level. Obviously, this could change the structure of the beaches and coastal ecosystems.

Due attention should be given to international efforts to study and minimize the influence of these atmospheric alterations in order to optimize the coastal zone management with a futurist planning. This possible influence should be considered in the development of commercial and fishing ports.

Finally, the problem of the urban settlements along the continental coast and the Galápagos can be adverse for the integrity of the environment because the behavior of the people generally is addressed to satisfy their personal needs without considering the measures to protect it.

#### 2.4.2 Risks of marine pollution

Although Ecuador has not yet had a considerable emergency due to shipping activities or incidents in land-based sources, which could contaminate the sea with oil or other noxious substances, the risks are always present in the marine area, where there is intensive traffic of all kind of vessels and in the coastal zone, where oil terminals, commercial ports and many industries are located.

In effect, in Ecuador there are four main commercial ports administered by autonomous port authorities, namely Esmeraldas, Manta, Guayaquil, the biggest, and Port Bolívar; and three oil terminals namely Balao, La Libertad and El Salitral.

On these ports and terminals, according to statistics from DIGMER, in year 1991 a total of 2,512 ships for international traffic were mobilized. In comparison with the total of 1,688 for 1986 it signifies approximately a 50-per cent increase in five years.

At the oil terminals of Balao and La Libertad, where there is active tanker traffic, the figures for 1986 were 102 ships and for 1991 they were 207. The latter figure was slightly higher because the exportation of crude oil was maintained without significant changes. The total amount of crude oil exported from Balao in 1991 was approximately 9 million metric tons.

At the beginning of 1991 the national merchant fleet, according to statistics from the same source, were composed of the following:

International traffic	:	32	vessels
Cabotage traffic (over 50 BRT)	:		
Oil tankers		25	"
Cargo and Passengers		69	"
Auxiliaries		4	"
Tugs		15	"
Barges		29	"
Miscellaneous		11	"
Fishing	:	412	"
		-----	
TOTAL			597 vessels

These vessels regularly operate in the Ecuadorian marine area between the principal and secondary ports. Some of them carry out activities in Galápagos Islands. If this total is added to the figures corresponding to the foreign ships that entered Ecuadorian ports during 1991, there were 2,512 for cargo vessels and 207 for oil tankers; the grand total is 3,312 vessels.

Hence, based on this quantitative analysis, it is possible to affirm that the amount of maritime traffic through the Ecuadorian territorial sea during a year is

significant. Consequently, due to these intensive shipping activities, the risks of sea contamination are always present, in particular for the operation of oil tankers. Therefore, the maritime administration should perform effective actions to regulate and control the vessels activities at sea, ports and oil terminals.

It will be necessary to increase the port state control in order to verify that the international regulations to minimize sea pollution are being complied with. The challenge to ensure that shipping activities are developed without risks to the integrity of the sea is great and is an incentive to fortify the internal structure of the maritime authority, which on the other hand are encouraging and promoting the development of the Ecuadorian merchant marine in order to satisfy the shipping needs of the nation.

#### **2.4.3 Capabilities of control and response means**

Due to the fact that the priorities of the national plans of development are focussed on resolving the economic and social necessities of the growing population, the available resources are principally distributed in areas which are intimately interrelated with the well-being of the people, such as education, health and facilities to increase work positions. However, the area related to preserving the environment is, in general, considered without the sufficient relevance that it deserves. The concept of sustainable development should play an important role in the considerations of those plans in order to ensure the rational distribution of the resources to support the human activities and also to protect and preserve the environment. It should be borne in mind that the nature can suffer irreversible impacts

which in the future will affect its capacity to offer adequate resources for human development.

In the maritime field there are many activities that are supported by national plans. Among them are the fisheries and associated industry, the development of commercial and fishing ports, the promotion of the merchant marine, the tourist development and the establishment of facilities to improve the operability of oil terminals and navigational routes. There is a specific programme to manage the coastal resources established in 1989 by an Executive Decree with aims of preserving, protecting and using coastal resources under planned, scientific and technic criteria in order to avoid the irrational use and encourage the ecological protection of the region. Nowadays this programme is well-structured and its functions are carried out under the direction of its higher authority, which is the National Commission. The maritime authority is integrated in this commission.

As can be understood many efforts are being implemented in the maritime field to regulate the rational use of the sea and coastal area through competent organisations whose budgets are included in the national one. However, due to economic limitations of the country, the budgets are structured to satisfy basic administrative and operative necessities. For this reason there is no enough financial support to materialize concrete actions for safeguarding the marine environment.

The Ecuadorian maritime authority is conscious of the importance of this fact bearing in mind that the emergencies in the maritime area can arise at any time. That is why a National Plan of Contingency to face oil spills has been structured taking into account the regional agreements to protect the maritime environment.

This Plan, that has been in force since September 1992, will be analyzed later, but in this section the real capacity to implement it is highlighted to visualize the scarce available resources.

In effect, the following list summarizes the principal equipment and materials to combat oil spills, available along the coast and distributed in the main ports and oil terminals:

Skimmer	1	Unit
Containment booms (sea)	1300	m.
Containment booms (river)	400	m.
Floating stores (10.000 gallons)	5	Units
Pumps (different types)	41	Units
Fire extintors	90	"
Launchs for personnel transport	9	"
Personnel protectors	62	"
Harbour tugs	15	"
Light vehicles	10	"
Heavy vehicles	4	"
Dispersants	18840	Gallons

As can be observed the amount of equipment and materials to implement the national contingency plan when a great emergency occurs in the maritime area in connection with oil spills is not sufficient to efficiently face the negative influences. On the other hand, due to the large extension of the Ecuadorian territorial sea, if an emergency occurs in the open sea far from the coast, there will be logistic limitations to fulfil the requirements of transportation for equipment and materials because there are no specialized vessels to carry out these tasks.



Concerning the control activities, it is evident that there is a lack of sufficient patrol boats to perform an effective surveillance of the maritime area, principally in the Galápagos where the Park Service is responsible for protecting the marine reserve.

In connection with fishing activities it is relevant to recognize the role that the Navy plays in order to cooperate with the fishing authorities to avoid illegal fishing. When the Navy units are operating they can inspect foreign fishing vessels to verify the required documentation. But still this is not sufficient to cover most of the territorial sea. The maritime authority, through the captainships, executes the control of the coastal zone in areas of its jurisdiction to support the related programmes and its appropriate development taking into account the protection of the beaches and resources of the coastal line. However, the control is not always adequate due to the scarce number of people and patrol boats which the captainships possesses and the hydrographic characteristics of some areas, such as the Jambeli Archipelago and the Ancon de Sardinias Bay.

#### 2.4.4 Education and Public awareness

The importance that the sea has for the development of the country has been a fundamental factor to encourage the appropriate utilization of its living resources and the natural facilities that it offers to develop shipping activities. For this reason it is possible to affirm that in the last decades the country has favorably reacted to the real significance of the sea and the need to protect its resources. Since 1952 when Chile, Ecuador and Perú signed in Santiago the "Declaration on Maritime Zone", the Ecuadorian government has maintained maritime policies addressed to preserve and protect the natural

resources of the sea; subsequently, the Convention for the Protection of the Marine Environment and Coastal Area of the South East Pacific (Lima 1981) established provisions at regional level to ensure the preservation of this specific sector of the ocean. This means that the governments involved must develop actions to promote the public awareness in matters related to the sea in order to fortify the maritime conscience of the people. Although some efforts have been performed to improve the educational levels and the generalized awareness on maritime matters, it should be recognized that there is a shortage of knowledge about the sea and the factors which can affect it.

A specific educational programme on marine-coastal affairs was developed in 1983 and is still being developed in which the Navy actively intervenes, but the resources are limited to extend its benefits not only on the population directly involved in maritime activities but on the entire country whose future is intimately interrelated with the sea.

#### References and Notes for Chapter II

1. Extracted from Derrotero de la Costa Continental e Insular de la República del Ecuador, Oceanographic Institute of the Navy, 1986.
2. Ibid

## CHAPTER III

### RESPONSIBILITIES OF THE MARITIME ADMINISTRATION IN CONNECTION WITH MARINE ENVIRONMENT PROTECTION

This chapter deals with the conceptual functions of the maritime administration and the obligations of the coastal state in matters related to marine environment protection. Additionally, the maritime administration of Ecuador and other specific countries will be analyzed in order to appreciate the role that they play in the field of the preservation of marine areas. The purpose is to visualize feasible measures for supporting the performance of the Ecuadorian Maritime Authority to face marine environmental issues.

#### 3.1 IMPORTANCE OF THE ADVISORY, REGULATORY AND DEVELOPMENTAL FUNCTIONS

The Maritime Administration of a country as an integral part of its overall Public Administration has the responsibility to administer the essential matters pertaining to the maritime sector. Its organizational framework should conveniently be arranged to efficiently undertake those functions which are embodied within the national maritime laws and to comply with the provisions of the International Maritime Conventions as well.

In this context the roles and functions of the Maritime Administration can be grouped in the following categories: advisory functions, which are related to the process of establishing the maritime policy; regulatory functions to ensure the enforcement of the legal provisions, especially those related to the shipping industry, maritime casualty investigations and protection of the marine environment; and developmental functions which directly contribute to maritime development.

These last functions are interrelated with the advisory functions because they can take the form of participation in the process of formulating the policy of the government as regards maritime development.

Concerning security it is important to emphasize that the most vital functions of the maritime administration are those intended to ensure the safety of life at sea, the safety of navigation and the protection of the marine environment. In connection with the purpose of this study it is relevant to consider that one of the primary functions of the maritime administration is to deal with matters pertaining to prevention, control and combat of marine pollution. The real importance of this function should be taking into account to implement appropriate measures to face the problems that can affect the marine environment.

These measures should be addressed to set up an adequate organization and to establish an effective contingency plan to combat marine emergencies.

Based on the foregoing considerations, it is relevant to point out that the functions of the maritime administration have a significant importance to regulate and promote maritime activities, with due regard to preservation of the marine environment. However, due to the fact that these aspects are intimately interrelated

they should be considered as a whole in order to apply the administrative actions in an effective manner. If the maritime development is encouraged, the protection of the marine environment should not be relegated as a matter of second importance. The activities of the maritime administration should have a common denominator related to preservation of the natural element where they develop.

### 3.2 THE STATE'S OBLIGATIONS IN ACCORDANCE WITH INTERNATIONAL AGREEMENTS

As was established in section 1.3, there are many international agreements related to preservation of the marine environment at global and regional levels. In general, these agreements contain provisions for encouraging effective co-operation among states.

If the state is signatory to these agreements, then it acquires the obligation to comply with these specific provisions in order to achieve better control of its respective maritime area. Consequently, the actions that the state perform will be of great benefit for its interests and for the region in general.

To point out the principal provisions in this context, it will be appropriate to highlight the most relevant conventions and agreements where they are established.

The Declaration of the Stockholm Conference (1972) contains 26 Principles, two of them, number 7 and 21, include a general obligation of states to preserve the marine environment and their responsibility to ensure that activities within their jurisdiction do not cause damage to the environment.

The International Convention for the Prevention of Pollution from Ships (MARPOL 1973/1978) establishes in Art. 1 the general obligations under the Convention in order to prevent pollution of the marine environment by the discharge of harmful substances from ships.

The United Nations Convention on the Law of the Sea (1982) establishes in Art. 192 that "states have the obligation to protect and preserve the marine environment"; additionally, Art. 197 emphasizes that the states shall co-operate on a global or regional basis for the protection and preservation of the marine environment. Art. 194 of this Convention specifically establishes the measures that the states must take to prevent, reduce and control pollution of the marine environment.

In general, Part XII of this Convention includes all measures that the states should perform to prevent, reduce and control pollution of the marine environment in accordance with International Rules and National Legislation.

The International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC-1990) is another agreement that deal with aspects of marine pollution prevention and response. Art. 7.1 establishes that the Parties agree to co-operate and provide services for the purpose of responding to oil pollution incidents.

In accordance with this statement, it should be recognized that clear and defined rules exist at international level to ensure the preservation of the marine environment through direct intervention and responsibility of the coastal state. In reality many states have implemented the necessary measures to comply

with the international regulations. Additionally, international maritime organizations, such as IMO are developing programs to advise and aid countries in order to facilitate the implementation of the IMO Conventions. With respect to the Law of the Sea and shipping activities the statement of Dr. Gold deserves to be considered<sup>1</sup>:

"Environmental Protection has become a very functional aspect of ship operations and coastal state control and the Law of the Sea Convention appears to be a reasonable balance".

It will be of positive effect for the preservation of the marine environment that states take into account the real importance of its role and responsibilities to implement the international regulations. They should adequately carry out the tasks concerning surveillance and monitoring of maritime activities within their jurisdictional area in order to ensure the enforcement of these regulations.

### 3.3 RELEVANT CONSIDERATIONS ON THE MARITIME ADMINISTRATIONS OF SOME SPECIFIC COUNTRIES

This section will focus on how the maritime administrations of some countries deal with maritime environmental issues through their internal organisations. The purpose is to assess each established framework with the objective of drawing insights from their experiences. Further on the study will analyze the Ecuadorian Maritime Administration, its role and functions and the activities that have been performed in the scope of the preservation of the marine environment.

For the purpose of this analysis, the maritime administration of two foreign countries, Spain and Sweden will be taken into account.

### 3.3.1 The Spanish Maritime Administration

In Spain I had the opportunity to carry out three weeks of research directly in support of this dissertation. That is why many aspects of its maritime administration are understood in practical terms. The circumstance that a new law on merchant marine and ports recently entered into force was of great value allowing me to visualize the changes that have been introduced to improve their structure.

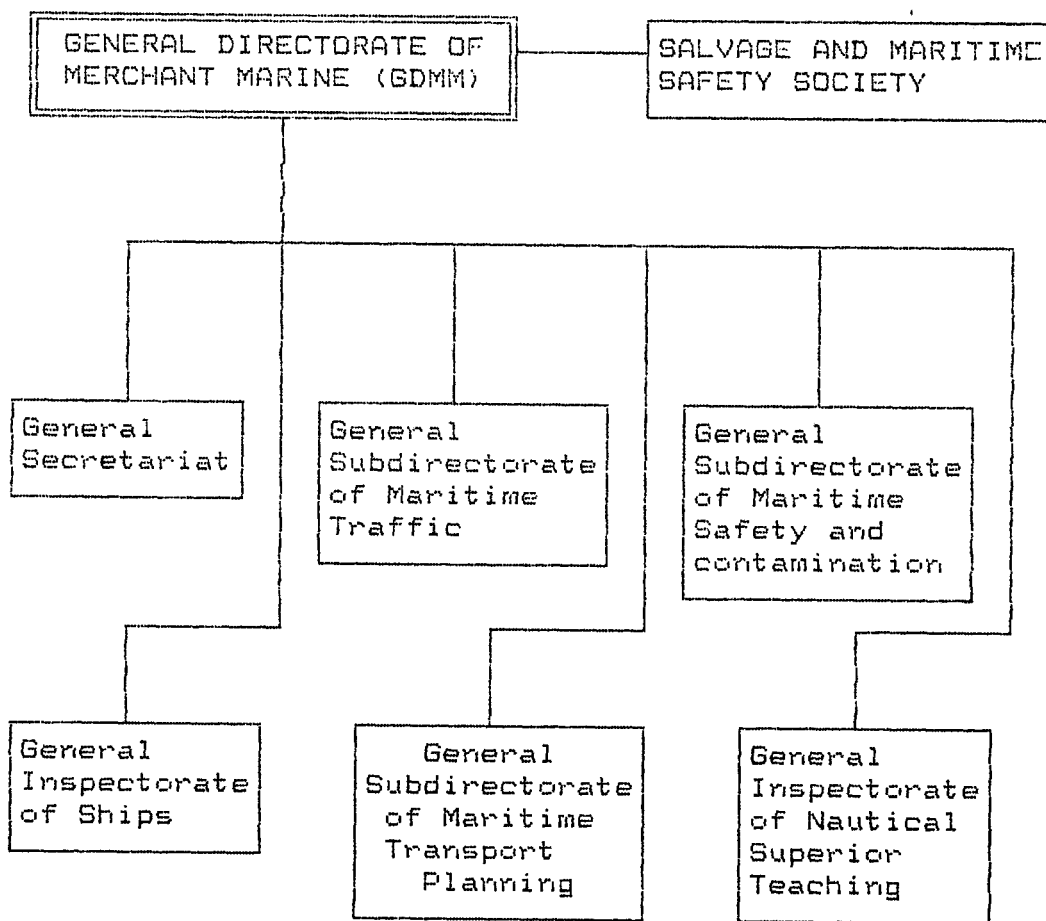
According with the State's Ports and Merchant Marine Law, the main bodies involved in the maritime administration are:

- Ministry of Public Works and Transports
- General Secretariat for the Transport Services
- General Directorate of the Merchant Marine with the Salvage and Maritime Safety Society

The General Directorate of the Merchant Marine constitutes the Spanish Maritime Authority. To carry out its designated functions the following framework has been legally established:



ORGANIZATIONAL DIAGRAM OF THE SPANISH  
GENERAL DIRECTORATE OF MERCHANT MARINE



The Art. 6 of the aforesaid law establishes consideration of as a function of the General Directorate of Merchant Marine<sup>2</sup>:

The prevention of contamination from ships, fixed platforms and other installations which are located in waters situated in zones in which Spain exercises sovereignty, sovereign rights or jurisdiction and the protection of the marine environment.

As can be seen in the foregoing framework, to the side of GDMM is the Salvage and Maritime Safety Society which according with Art. 90 of the law<sup>3</sup> has the purpose to:

render services of maritime search, rescue and salvage; of control and aid to maritime traffic; of prevention and fighting against the marine environment contamination; of towing and auxiliary vessels.

The Organic Structure Manual of the GDMM contains the functions and responsibilities of its internal organisations. One of them of specific interest is the General Subdirectorate of Maritime Safety and Contamination, which is responsible for the functions related to prevention and detection of marine pollution as well as for structuring The National Contingency Plan to face accidental marine contamination.

With relevance to structuring the national contingency plan, there is a project which, after a final revision, will be approved by the competent authority. This project entitled "National Plan of Contingencies for Accidental Marine Contamination" contains relevant

elements to carry out the appropriate actions during an emergency. It includes the organizational framework, the mechanisms for co-ordination; operative procedures; managing of means and services, legal aspects and international agreements related to marine contamination. The plan is complemented with important annexes on sensitive coastal areas, inventory of means, lists of authorities, experts and organizations integrated to the plan.

Another legal instrument of significance to the marine environment is the "Spanish Shores Act" in force since 1988 +:

The purpose of this Act is to define, protect and regulate the use and government police power on the coastal public property and, in particular, the shores.

The organisation responsible to apply this Act is the General Directorate of Shores.

Additionally, it is necessary to mention that under the Ministry of Public Works and Transports there is another secretary entitled "State's Secretariat for Water and Environment Policies" which is at the same level as the General Secretariat for Transport Services. This State Secretariat through its subordinated organisations performs activities to ensure an adequate environment. It develops policies, programs and operative instruments oriented to solve environmental problems. Under this secretariat are the General Directorate of Shores and the General Directorate of Environmental Policy.

Based on the foregoing explanation about the Spanish organisations which have responsibilities on matters related to protection of the marine environment, the following considerations can be established:

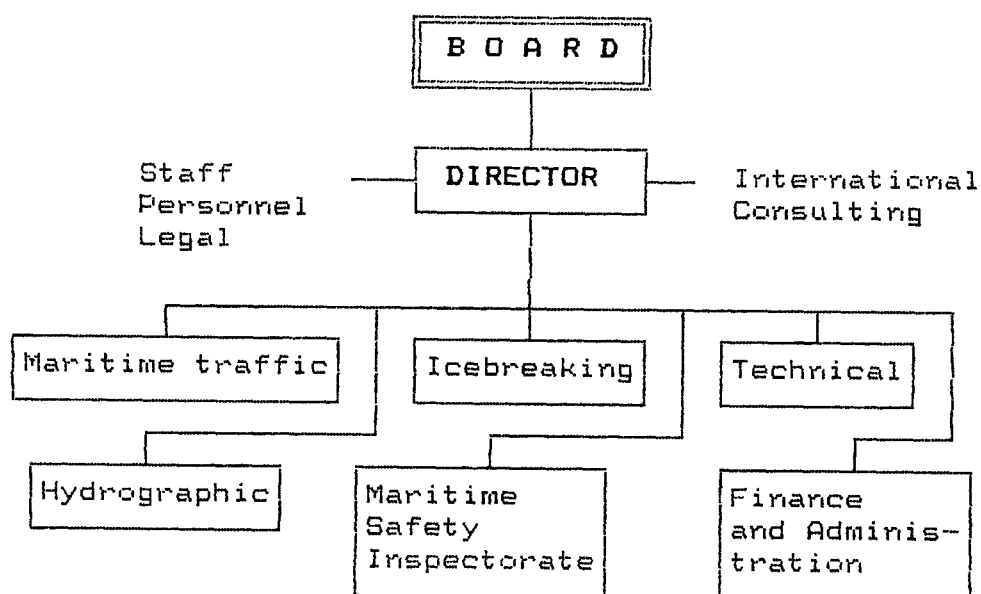
- The creation of the Salvage and Maritime Safety Society as an entity of public right with legal personality, their own patrimony and full capacity to act, is an important step to develop and improve the appropriate mechanisms to combat marine contamination. It has an adequate level of autonomy to perform its functions according to current requirements. Actually, this society is structuring its human and material resources to start the operational activities with effectiveness
  
- The work of the General Subdirectorate of Maritime Safety and Contamination and the aforesaid Society will ensure the implementation of appropriate administrative and operative measures to carry out effective actions against marine contamination.
  
- With respect to the National Contingency Plan, it is a well-structured document which contains the basic elements for developing the planned activities in a rapid and coordinated manner
  
- Concerning the coastline, it is relevant to mention that the General Directorate of Shores carries out significant efforts to control the use and property of the coastal area within the established legal limits and to regenerate beaches which have been affected by nature or by human activities
  
- Finally, in accordance with legislation, the Spanish Navy has no responsibilities within the maritime administration. But, in cases of emergencies in the maritime area, it can co-operate, offering its resources, such as patrol boats and helicopters to support specific operations.

### 3.3.2 The Swedish Maritime Administration

The National Maritime Administration in Sweden was established in 1956. Further on in 1987 it was transformed into a public agency working within the transport sector. According to the regulations laid down by the Swedish Parliament and Government, the Maritime Administration primarily serves merchant shipping; but the interests of yachting and fishing are also considered.

The Swedish Maritime Administration comes directly under the Ministry of Transport and Communications. To carry out its activities it has the following organisational structure:

ORGANIZATIONAL DIAGRAM OF THE SWEDISH MARITIME ADMINISTRATION



Based on in this framework, the range of services provided by the Administration includes:

- Supervision of maritime safety
- Protection of the marine environment against pollution from ships
- Pilotage
- Marking of fairways
- Search and rescue
- Icebreaking
- Marine surveying and the production of nautical charts

Concerning activities related to marine environment protection, it is important to emphasize that the Maritime Administration is responsible for Swedish territorial waters, and international waters in accordance with agreements with neighboring countries. Matters regarding environmental protection in the Baltic are handled within the framework of the "Convention on the Protection of the Marine Environment of the Baltic Sea". The Maritime Administration has continuously taken part in the work of several international organisations including the Helsinki Commission, Port State Control Committee and International Maritime Organization (IMO). Additionally, the Administration has served in an international consulting capacity on several projects on search and rescue, maritime safety inspection, and protection against water pollution, which have been needed by countries in South East Asia, Eastern Europe and Southern Africa. Also, it has provided seminar leaders and experts on matters of maritime inspection and maritime environment protection at international seminars in the country. In this context, The Maritime Safety Inspectorate has had an active participation through its internal structure which is organized as follows:

Ships Technical Division  
Ships operative Division  
Accidents Investigation Division  
Inspectorate Areas: Stockholm, Malmö and Gothenburg  
Inspectorate office Rotterdam

This Inspectorate co-ordinates with the Swedish Coast Guard in matters related to marine environment protection. The Coast Guard is a civil authority for surveillance, supervision of regulations at sea and protection of the marine environment. Its budget is provided by the Ministry of Defence.

Taking into account the nature of this study, it is important to highlight the functions that the Swedish Coast Guard carries out to ensure the preservation of the marine environment. The functions are included within the following Programmes:

- a) **Marine Environmental Protection**
  - Surveillance and monitoring
  - Abatement of marine pollution at sea and in the coastal waters
  
- b) **Supervision and Law Enforcement**
  - Territorial waters interests
  - Fishery within the fishing zone
  - Hunting and fishing in the coastal zone
  - Sea traffic in navigable waters
  - Continental shelf activities
  - Dumping
  
- c) **Search and Rescue**

In view of the large Swedish Coastal Zone, the Coast Guard has emphasized the mobility of its resources. Its fleet is actually composed of approximately 130 vessels, some 30% of which are dedicated to pollution combat work. Great efforts have been made to develop techniques for responding to oil spills; for this purpose it has appropriate equipment, such as booms for confinement, skimmers and devices for storage of recovered oil.

To summarize this statement, it is relevant to emphasize that the Swedish Maritime Administration carries out tasks to ensure efficiency in shipping for economy in maritime transport, and in maritime safety for the protection of man and the environment. The Coast Guard in turn, performs specific operative functions to combat marine pollution.

An effective co-ordination exists between these two organisations to facilitate the performance of their tasks.

### 3.4 THE ECUADORIAN MARITIME ADMINISTRATION

In accordance with the Political Constitution of Ecuador many laws to regulate maritime activities have been established through the years.

The purpose of these laws is not only to establish the legal framework of the bodies directly involved in the maritime administration but also to encourage the maritime development of the country. Among the principal laws which have an effect on the role that the Ecuadorian Maritime Administration plays in controlling shipping activities are the following:



- General Law for Fluvial and Maritime Transport
- Maritime Police Code
- Law for the Promotion of the Merchant Marine
- General Law for Ports
- Law for the Administrative Regimen of National Ports
- Law for the Administrative Regimen of Oil Terminals
- Law for lighthouses and Bucys

These laws are complemented by specific subsidiary regulations which state the procedures to apply on the different legal provisions.

#### 3.4.1 Main bodies involved

The principal source for the organisation of the Maritime Administration is the General Law for Fluvial and Maritime Transport, which is based on the following considerations:

- The necessity to regulate activities as regards aquatic transport because of its substantial influence on the national economy
- The necessity to determine the governmental organisations to direct, supervise and control the aquatic transport as well as to limit their attributions, obligations and responsibilities.

To be consistent with these considerations Article 1 of this law establishes the main organisations to carry out the functions related to orientation, administration and fiscal responsibility for the activities concerning aquatic transport. These organisations showed in Annex "C" are:

- Ministry of Defence
- The National Council for Merchant Marine and Harbours; and
- The General Directorate of Merchant Marine and Littoral (DIGMER).

The basic functions and general tasks for these organisations are clearly determined in the law. Nevertheless, it is necessary to emphasize that the National Council for Merchant Marine and Harbours, as the highest consultancy organisation for the government, has the general functions related to orienting, establishing and co-ordinating shipping policies at a national level.

The General Directorate of Merchant Marine and Littoral is the executive arm for the policy of aquatic transport determined by the aforesaid National Council. For the purposes of this study, the most relevant aspects of this General Directorate are considered in the following paragraph.

#### **3.4.2 The General Directorate of Merchant Marine and Littoral - Functions and structure.**

This organisation (DIGMER) is a branch of the Ecuadorian Navy, directly subordinated to the Commandant General of this institution. It constitutes the Maritime Authority duly empowered by the law to control the maritime activities within its jurisdiction.

Based on national laws, particularly the General Law for Fluvial and Maritime Transport (Art. 7) and the Maritime Police Code, this Directorate through its subordinated organisations carries out functions related to the control of shipping activities, safety of navigation, protection of human life at sea and control of sea and

river contamination. Those functions considered as being especially significant for the purpose of this study are summarized as follows:

a) To take the necessary action for the application of national regulations as well as the provisions of International Conventions to which Ecuador is a Party, and to make recommendations for adhering to other global or regional conventions, which have been found useful for the safety and development of maritime activities

b) To ensure the fulfillment of all Regulations in connection with maritime traffic control

c) To ensure the maintenance of the principles of authority, responsibility and discipline on the vessels involved in maritime and fluvial traffic

d) To direct, orientate and support the Merchant Marine Academy as well as the post-graduate courses which are necessary

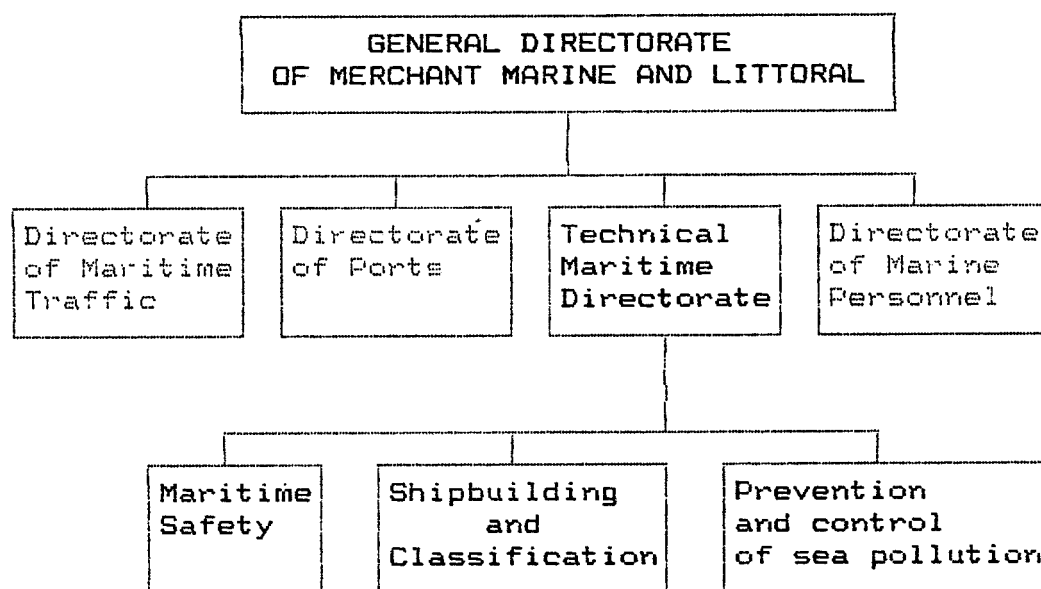
e) To regulate and control the seaworthiness of all ships whether they are Ecuadorian or not

f) To exercise the control of sea and river contamination in co-operation and co-ordination with other national or international organisations

g) To keep up-dated studies related to the capacity, composition, characteristics and development of the Merchant Marine

h) To command and operate the Coast Guard.

The DIGMER has jurisdiction over the Ecuadorian territorial sea, rivers and lakes, beaches and bays, ports and oil terminals in order to apply the national laws and regulations. To carry out its functions this Directorate is internally organized as follows:



The following organisations are directly subordinated to the General Directorate:

- Captainships of Ports
- Coast Guard
- Merchant Marine Academy

Taking into account the aims of this study, the Technical Maritime Directorate is the organisation that comes closest to matters concerning marine environment protection. In fact, this Directorate has a specific "Department for Prevention and Control of Sea Pollution" which carries out the following functions:

- a) To elaborate and propose technical projects and/or reforms to regulations and manuals related to sea contamination with the purpose to keep up-dated pertinent laws and regulations
- b) To advise captainship of ports and superintendencies of oil terminals on matters related to sea contamination
- c) To intervene on behalf of the General Directorate in jobs concerning preservation and control of the marine environment, with other national institutions involved
- d) To participate and advise in activities related to sea contamination according to the international Conventions in this field
- e) To carry out inspections to prevent sea contamination from any ship, oil terminal, dock and industrial installation within its jurisdiction
- f) To organize courses or seminars to improve the capabilities and skills of the personnel involved in matters related to sea contamination
- g) To conduct the "National Plan of Contingency to face hydrocarbons spills".

This Department exercises functional authority over the units for prevention and control of sea contamination which are part of the superintendencies of oil terminals of Balao, La Libertad and El Salitral.

To carry out the functions described above, the Department has limited human and material resources. It is an impediment to take all the necessary actions to effectively meet the requirements as regards measures for

protecting the marine environment. For this reason this Department should gradually be strengthened to facilitate its performance over the extensive area of its jurisdiction.

### **3.4.3 Performance in activities concerned with marine environmental protection**

#### **a) The National Contingency Plan for Hydrocarbons spills**

As was mentioned in section 2.4.3 the Ecuadorian Maritime Authority is aware of the fact that emergencies in the maritime area can arise at any time due principally to shipping activities. In this context, the exploitation and exportation of oil resources deserve particular consideration because the operations of tankers and oil terminals are directly connected with the sea. Therefore, the risks of sea pollution by oil are always latent. For this reason the DIGMER structured a national plan to deal with this kind of emergency. This plan, in force since September 1992, has been elaborated taking into account provisions of national laws and international conventions on matters concerned with marine pollution, such as the Maritime Police Code, MARPOL 73/78 and the Convention for the Protection of the Marine Environment and Coastal Area of the South East Pacific (Lima 1981).

The objectives of this plan are:

- To establish the legal framework which assigns responsibilities and obligations for the organisations involved

- To facilitate the development of the necessary actions and mechanisms in order to ensure a rapid, efficient and effective response against oil spills
- To achieve the optimum utilization of the national resources available to control this kind of emergency.

The National Plan of Contingency is activated only in the case of a major oil spill which requires a considerable mobilization of the national human and material resources and, if it is necessary, those of other countries according to the existent agreements of co-operation.

To face emergencies which could occur in localized geographic areas, such as ports, oil terminals and determined coastal zones, there are specific plans to cover these areas. These are the Local Contingency Plans and the Zonal Contingency Plans.

The Local Contingency Plan covers specific coastal installations, such as ports and oil terminals. They are under the responsibility of the Port Authorities and the Superintendencies of oil terminals.

The Zonal Contingency Plan covers an extended maritime and coastal zone. It should be applied when the magnitude of the oil spill exceeds the capability to control it with a local plan. Three zones in the maritime area and one in the Amazon region have been considered for elaborating these plans. The institution responsible for managing these plans is specified in each one.

The functional structure of the National Contingency Plan includes:

- The responsible Organisation with the Adviser Technical Committee
- Response Centres (National, zonal and local)
- Response Groups (National, zonal and local)
- Coordinators on scene

In general, the analyzed document contains an appropriate organisational structure and basic information on various aspects relate to oil spills. However, it should be complemented with annexes which provide information on sensible Ecuadorian maritime areas and on organisations which would cooperate to implement the plan. Additionally, periodical simulated exercises should be carried out to prove the effectiveness of the plan, principally, as regards co-ordination measures and logistic activities which are of great importance when an oil spill occurs.

#### **b) The Programme for Managing Coastal Resources**

This Programme (Spanish acronym PMRC) was established with Executive Decree N: 3399 on 1st June, 1992, as an adscript organisation to the Presidency of the Republic. It is based on the Executive Decree N:375 of January 1989, which created the programme, and the Technical Cooperation Agreement signed on 3 March, 1986 between the Ecuadorian Government and the United States Agency for International Development (USAID) and the Rhode Island University, with the purpose of carrying out a Project for managing coastal resources.

According to the Decree of 1992 (Article 2) the programme has the aim of conservation, restoration, protection and sustainable development of the coastal resources of the coastal Provinces and Galápagos.

The Programme has the following basic structure:



National Commission  
Executive Directorate  
Zonal Organisations for management  
Units of surveillance and Conservation

The Maritime Authority (DIGMER) has active participation within this structure because it is part of the National Commission, on behalf of the Minister of Defence. Additionally, the coordination of the Units of Surveillance and Conservation is under the responsibility of the respective Captain of Port or the functionary who is nominated by DIGMER.

The principal functions of the National Commission are related to the approval of the Annual Working Plan of the Programme and the Managing and Developing plan of the Special Zones of Managing. Another function is to create and abolish Special Zones of Managing as well as to declare critical areas in order to face ecological risks or conflicts which could arise in the coastal zone.

Concerning the responsibilities of the Units of Surveillance and Conservation, according to Article 10 of the aforesaid Decree, they should promote the knowledge and enforcement of the laws and regulations as well as the administrative and technical rules referred to protection, preservation and adequate use of the resources.

Given the importance of this programme, the organisations involved in its implementation should be aware of the different factors that influence management of coastal resources. For this reason the Maritime Authority should ensure that expert personnel participate in the meetings of the National Commission and in the specific activities of the Units of Surveillance and Conservation.

#### 3.4.4 The relationships at global and regional levels

Given the fact that Ecuador is a maritime country it has participated in international meetings where maritime affairs are treated. Many efforts have been made to improve its relationships with organisations, such as UNEP and IMO which deal with matters related to preservation of the oceans. Two national organisations within the scope of the Navy structure have responsibilities concerned with global and regional conventions and agreements. One of them is the General Directorate of Maritime Interests (DIGEIM) and the other one is the General Directorate of Merchant Marine and Littoral (DIGMER).

The latter, as the Maritime Authority, carries out tasks addressed to achieve an effective implementation of the provisions stated in international agreements. To do so it takes into account the feasibility of appropriate measures which may be applied in its jurisdiction without contradiction to national laws and regulations. In addition, international recommendations and guidelines are observed to conceive adequate procedures and to set up the organisation.

In this context, Ecuador has been a Member of IMO since 1956. It has a Permanent Representative to IMO with the purpose of maintaining a closer relationship with this organisation. The country is a party to, and has ratified the following IMO Conventions:

- International Convention for the Safety of Life at Sea (SOLAS 1974) as amended
- Convention on the International Regulations for Preventing Collisions at Sea (1972)
- International Convention on Load lines (1966)
- International Convention Relating to Intervention on

the High Seas in Cases of Oil Pollution Casualties (1969)

- The International Convention on Civil Liability for Oil Pollution Damage (1969)
- International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78)
- International Convention on Maritime Search and Rescue (1979)
- International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW/78)
- Convention on Facilitation of International Maritime Traffic (1965).

At regional level the Ecuadorian Maritime Administration has developed and implemented relevant actions under the umbrella of two organisations and one regional convention. These have direct connection with the protection of the marine environment. These agreements are described in the following paragraphs.

**a) The Permanent Commission of the South Pacific**  
(Spanish acronym CPPS)

This is an organisation established on 18 August 1952 in Santiago de Chile by the "Declaration of Santiago" ratified by the Governments of Chile, Ecuador and Perú. On 9 August 1979 the Government of Colombia joined the System of the South Pacific by adhering to the Declaration of Santiago.

The aims of the Commission are:☐

- to co-ordinate maritime policies of member states, and,
- to foster the State's national potentialities for development.

Since the year of its establishment the Commission has carried out relevant activities related to:

- The protection, conservation and utilization of the marine resources of the South East Pacific
- The regional co-ordination for the protection and conservation of the marine environment and coastal areas
- The development of the scientific research
- The training of technical and scientific personnel
- The study and regional co-ordination of legislative matters

**b) The Operative Network for Regional Co-operation among Maritime Authorities.**

(Spanish acronym ROCRAM)

This organisation is composed of the Maritime Authorities of 10 South American countries, Mexico and Panamá which are conscious of the need for co-operation to overcome common problems related to maritime activities and the importance of working together to facilitate the solution of those problems. In this way corrective measures can be correctly implemented avoiding waste of time and resources.

One important aspect of the ROCRAM is that its work is being done together closely with IMO, which co-operates with the organisation to achieve better results.

Until now six meetings of ROCCRAM have been carried out; the last one was held in Viña del Mar Chile (November 1992).

Concerning the protection of the maritime environment, some specific resolutions have been taken by ROCCRAM, these are:

Resolution N: 3 (ROCCRAM III-1987)

- (1) To recommend that all member countries of ROCCRAM adhere/accede to the MARPOL 73/78
- (2) To recommend the promotion of MARPOL 73/78 through the training of people.

Resolution N: 3 (ROCCRAM V-1990)

- (1) To request that IMO, with the opportunity to define the Global Programme of the protection of the marine environment, considers the assignment of resources to ROCCRAM as a priority in order to finance the activities for an effective implementation of the Strategy.
- (2) To encourage the participation of high level delegations of members of ROCCRAM in the International Conference of Preparedness and Response against Contamination, to be held at IMO from 19 to 30 November, 1990.

Resolution N: 4 (ROCCRAM VI-1992)

- (1) To recognize the work carried out by the specialists of ROCCRAM in connection with the objectives of the ROCCRAM-STRATEGY 1990-2000 for the protection of the marine environment.
- (2) To instrument the following aspects related to protection of marine environment:
  - To adopt the "Latin American Guidelines for reception facilities stated by MARPOL 73/78" as a basic reference of the matter

- To assist in the internal dissemination of information derived from OMI, regional meetings and other sources, to other governmental organisations (Ministries of Foreign Affairs, Environment and Transport, Parliament, etc.) and maritime and industrial enterprises (shipowners, oil enterprises, shipyards, classification societies, fisheries, etc.)
- To promote and diffuse the objectives of the ROGRAM-STRATEGY in the Latin American Group at IMO, in order to fortify the regional participation
- To utilize the operative capabilities of the oil enterprises in the response to oil spills and promote co-operation between the private and public sectors.

Resolution No: 5 (ROGRAM VI-1992)

This Resolution refers to the approval of the Latin American Agreement on Port State Control to combat the problem of sub-standard shipping.

This agreement takes into account the importance of safety of life at sea and the increased need to protect the marine environment and its resources. Under the agreement, within three years each state will inspect 15% of foreign-flag ships visiting its ports to ensure that they comply with major treaty instruments.

The new organisation will be given assistance by the secretariat of the Paris Memorandum of Understanding on Port State Control, which provides a similar ship inspection scheme in Europe.

In addition, an important document entitled, ROGRAM 1990-2000 Strategy for the Protection of the Marine Environment was approved on 13 October 1989 which

envisages numerous activities, such as studies, training programmes and technical advice services. Paragraph 19 of this document clearly states that through this Strategy, ROCRAM seeks, inter alia:

- to expand its capacity to effectively protect the regional marine environment, namely coastal waters, through this planning and co-ordinating tool;
- to intensify regional co-operation between the Maritime Authorities of ROCRAM, extending it to the countries of ROCRAM-CA;
- to co-ordinate a joint effort involving the various national sectors in the protection of the marine environment, incorporating shipping companies, operators of maritime tanker terminals, and the maritime industry in general.

**c) The Convention for the Protection of the Marine Environment and Coastal Area of the South East Pacific (Lima 12 November 1981)**

After the UN Conference on the Human Environment (Stockholm 1972), the UNEP has carried out a series of actions to promote regional agreements for the environmental protection of relevant parts of the oceans. For this purpose in 1974, the UNEP structured a Regional Seas Programme, which today covers ten regional seas and involves more than one hundred countries. Based on this programme many regional conventions were signed among countries located in a specific marine area. One of them is the Convention of South East Pacific, which is treated in this section. The Convention was signed in Lima, Perú on 12 November 1981 by the government of Colombia, Chile,

Ecuador, Panamá and Perú which recognized the need to protect and preserve the marine environment and coastal zone, and the desirability of co-operating at a regional level to achieve the objectives related to that necessity. Article 3 entitled General Obligations contains in numeral 4 an important statement which says:

The High Contracting Parties shall co-operate, on a regional basis, directly or in collaboration with the competent international organisations, in formulating, adopting and implementing effective rules, standards, practices and procedures for the protection and preservation of the marine environment and coastal area of the South-East Pacific against all types and sources of pollution, and in promoting appropriate environmental management of such environment and area, taking into account characteristic regional features.

Article 4, entitled Measures to Prevent, Reduce and Control pollution of the marine environment, specifies that the measures will be designed to minimize the threat from all types and sources of pollution, such as vessels, land-based, any other installations or devices operating in the marine environment and also from or through the atmosphere.

Article 6 emphasizes the need to jointly promote and develop contingency plans for responding to pollution incidents in the marine environment.

The Convention has an Agreement on Regional Co-operation in Combating Pollution of the South East Pacific by Hydrocarbons or other Harmful Substances in Cases of Emergency. This Agreement contains general principles for co-operation in taking the necessary measures to



neutralize or control the harmful effects resulting from emergency situations.

In addition, two supplementary protocols to the agreement of the convention were signed at Quito, Ecuador on 22 July 1983. These protocols specify the mechanisms of co-operation in the event of a considerable oil spill, the description of the national contingency plan; and the obligation, practice and procedures concerning protection of the South East Pacific against pollution from land-based sources.

The Permanent Commission of the South Pacific (CPPS) discharges the functions of Executive Secretariat of the convention, agreement and protocols.

The Convention provides the legal framework for the Action Plan to be applied in the region.

The Action Plan consists of three basic components following the framework adopted for environmental action by the UN Conference on the Human Environment (Stockholm 1972). These components are:

- Environmental assessment (evaluation and review, research, monitoring, information exchange);
- Environmental management (goal setting and planning, international consultation and agreements); and
- Supporting measures (education and training, public information, technical cooperation, organisation, financing)

Every two years an intergovernmental meeting concerning the Action Plan for the protection of the marine environment and coastal areas of the South East Pacific is carried out to deal with matters related to implementation of the plan. Delegates from the Ecuadorian Maritime Authority participate in these meetings. The last meeting was held in Santiago, Chile in December 1991.

As can be seen, the Ecuadorian Maritime Authority maintains important relationships at global and regional levels. Consequently, it needs to be structured to effectively implement the provisions, regulations and recommendations which emerge from the various agreements. The availability of sufficient expert personnel and appropriate material means are necessary to carry out the corresponding actions over its jurisdiction, and also for improving the co-operation and co-ordination among countries of the region. To satisfy these requirements, the allocation of financial resources for more forceful environmental protection action is a real necessity. These aspects were emphasized in section 2.4.3 concerning capabilities of control and response means.

#### References and Notes for Chapter III

1. Dr. GOLD's Lecture on International Maritime Law (Jun/92)
2. The Spanish Law for State's Ports and Merchant Marine Art.6, consideration 1 f.
3. Ibid (Art. 90)
4. The Spanish Shores Act: Introductory Title-Section 1
5. International Organizations. Year Book 89/90

## CHAPTER IV

### SUGGESTED MEASURES TO IMPROVE MARINE ENVIRONMENT PROTECTION IN ECUADOR

The purpose of this chapter is to suggest practical measures to achieve effective performance of the Ecuadorian Maritime Authority as regards its responsibilities in the field of protection of the marine environment. According to capabilities of the organisation specific actions can gradually be implemented to fulfil requirements of these measures. Five relevant areas have been chosen for grouping the suggested measures. They are related to administrative, educational and coastal zone management aspects; availability of resources and international co-operation.

#### 4.1 ADMINISTRATIVE AND ORGANISATIONAL ASPECTS

Taking into account relevant considerations made in previous chapters about importance of the oceans, factors which affect the integrity of the marine and coastal areas, the current situation of the country in matters related to protection of the marine environment and the functions of the Ecuadorian Maritime Administration, this section states administrative suggestions for organisational adjustments, assessment of some environmental legal provisions and improvement of contingency plans.

#### 4.1.1 Organizational Adjustments

With the aim to facilitate some organizational adjustments to be considered by the institution concerned the following functions related to protection of the marine environment are suggested:

##### a) General functions

- To deal with prevention, control and combat of marine pollution by exercising the statutory powers given by national laws, and international conventions to which the country is party;
- To advise in the formulation of Maritime Policy as regards relevant aspects concerning with protection of the marine environment;
- To analyze and recommend the desirability to become party of international conventions related to protection of the marine environment, to which the country is not party;
- To approve and issue the National Contingency Plan to face marine pollution incidents;
- To propose reforms to laws and regulations which have effect in activities related to preservation of the marine environment;
- To conduct inquiries and investigations concerning marine pollution incidents in coordination and co-operation with other related entities;

- To co-operate with national institutions which perform activities in marine and coastal areas, such as General Directorate of Environment, National Parks Services and National Directorate of Fishing in order to ensure the effectiveness of control measures and development of educational programmes;
- To encourage and promote public awareness on matters concerning with protection of the marine environment.

**b) Specific functions**

- To elaborate and conduct the National Contingency Plan to face marine pollution incidents, taking into account characteristics of the marine and coastal areas, national capacities and relevant provisions and recommendations of international agreements;
- To establish guidelines for Port Authorities and Superintendencies of oil terminals in order to prevent incidents which could produce marine contamination;
- To plan and execute exercises with regard to sea pollution emergencies;
- To carry out research and collect information on the current condition of the national marine and coastal areas as regards contamination;
- To inspect ships, mobile rigs, floating materials, docks, oil terminals and industrial installations including waste reception facilities within national jurisdiction in order to verify legal and technical regulations for preventing sea pollution;

- To manage and control marine dumping authorizations;
- To participate in activities concerning protection of the marine environment according to provisions of international agreements and resolutions of regional organisations, namely IMO Conventions, Action Plan for the South-East Pacific and Operative Network for Regional Co-operation among Maritime Authorities;
- To intervene in jobs concerning managing of Coastal resources within the framework of the respective national programme;
- To organize courses and seminars for improving capabilities and skills of the personnel involved in tasks related to prevention and control of marine contamination;
- To advise local maritime authorities, superintendences of oil terminals and Port Authorities on matters related to sea contamination;
- To maintain an inventory of available equipment and materials to face sea pollution emergencies;
- To recommend types and quantity of materials to be acquired to support the activities related to control and combat of sea pollution;
- To carry out a publicity campaign to promote the public awareness on matters concerning protection of the marine environment.

This set of functions could be included within the current organisational framework of the Maritime Authority (DIGMER) in order to state its responsibilities as regards marine environmental matters.

The general functions can be performed by the General Directorate through maritime and legal advisers and the Technical Maritime Directorate.

The specific functions should be assigned to the Department for Prevention and Control of Sea Pollution, which is part of the Technical Maritime Directorate. To carry out these tasks the following Divisions are proposed:

Planning

Research and Information

Inspections

Material and Equipment

Educational and Training, and

National and International co-ordination

Subsequently, according to the magnitude of its activities this Department could be required to ample its internal organisation; consequently, more human and material resources will be necessary.

#### **4.1.2 Legislative Aspects**

According to the previous analysis made in section 2.2 on legislative matters, the country actually possesses laws and regulations to prevent contamination of the environment and to control the rational use of the national waters.

Some of them, such as the Maritime Police Code, the Law of Fishing and Fishery Development, and Decrees for protecting mangroves and the Galápagos Islands have a direct effect on the maritime and coastal area. However, other laws, such as the Law for Prevention and Control of the Environment Contamination, the Water Law and the Law for Municipality Regimen state general provisions to prevent environment contamination derived from activities which are performed on land areas.

Furthermore, the country is party to some international conventions related to protection of the marine environment for which it has the responsibility to ensure the enforcement of legal provisions stated in those agreements.

For these reasons it is necessary to carry out studies to update and harmonize the national laws with the aim to ensure their effectiveness and adequate co-ordination among responsible executive organisations.

The Ecuadorian Maritime Authority should analyze the national laws which specifically contain provisions for prevention of environment contamination in order to determine if such provisions appropriately cover the marine area. As a starting point for this analysis the following suggestions can be considered:

- The Law for Prevention and Control of Environment Contamination should have a specific section to deal with the marine environment and necessary measures to prevent and control sea contamination.
- The Water Law should be complemented with provisions to ensure the quality of the water in coastal areas due principally to development of activities related to mariculture.



- The Law for Municipality Regimen should strengthen its provisions concerning the sewage network and waste elimination in order to prevent contamination of rivers and consequently sea pollution
- Additionally, the provisions of global and regional agreements to which the country is party should be taken into account to determine the desirability and the manner in which they can be adopted within the national legislation.

Once the laws have been up-dated and harmonized it will be desirable to establish effective mechanisms of co-ordination among various institutions which have responsibilities for the enforcement of legal provisions concerning preservation of marine and coastal areas. Otherwise the fragmentary approach to control activities that affect the marine environment could be a constraint to efficiently applying regulatory measures. In this context, the role of the Ecuadorian Maritime Authority acquires a paramount importance because it has direct relation with co-operative and co-ordinative functions for ensuring an adequate marine environmental protection. If the Division for National and International Co-ordination, suggested in section 4.1.1, is appropriately implemented it can function as an effective center of co-ordination which would channel, not only the actions of the national organisations, but also the interrelationships with global and regional organisations which deal with matters related to protection of the marine environment.

The author believes that periodical meetings among representatives of national institutions would be an effective procedure for ensuring co-operative efforts through actions duly co-ordinated.

It should be emphasized that the establishment of effective co-ordination is the critical first step in achieving a successful performance in the field of marine environmental protection.

#### 4.1.3 Planning Aspects

One important function of the Maritime Administration in the sphere of protection of the marine environment is related to measures to combat marine pollution. Consequently, it should promote and establish contingency plans and programmes aimed at combating accidental marine contamination.

The purpose of this section is to emphasize the importance of contingency plans and the most relevant aspects that they should cover in order to ensure their effectiveness. A well-structured plan should facilitate the implementation of operative actions.

First, it is necessary to mention that time and organisation are of primary importance to carry out successful actions during an emergency. The time factor is intimately linked with the organisational framework because a clear and simple organizational scheme saves time during the decision-making process, particularly when the decisions are related to definition of means to be utilized during the operative phases of the plan.

Another important aspect needed to achieve rapid development of operations is co-ordination among the organisations involved in the plan. In this way individual efforts and adequate utilization of human and material resources can be optimized. This acquires a particular importance when contamination reaches the coastline.

The contingency plans at national, zonal and local level should determine the general procedures to be followed in each particular case. However, although they are separately elaborated, they should have a common structure in order to easily permit the change from one to another.

Even though there are international regulations and recommendations to adopt a common structure for contingency plans, it is important to consider specific characteristics of the country concerning geographical features and administrative framework in order to establish an adequate zoning and to define levels of competency among responsible organisations.

In the case of Ecuador, it is appropriate to consider that its jurisdictional maritime area is very extensive; that the Galápagos Islands are located at a considerable distance from the coast; and, that the Amazon region is the place where operations of exploration and exploitation of hydrocarbons are carried out with the risks of potential contamination.

Concerning measures of co-ordination, they should be established to facilitate the performance of the following organisations:

- Maritime Authority (DIGMER)
- National Directorate for Civilian Defence
- Military Authorities
- National Directorate of Hydrocarbons
- National Institute of Fishing
- Programme for Managing Coastal Resources
- State's enterprise "PetroEcuador"
- Port Authorities
- Local Authorities

It is recommended for structuring the National Contingency Plan that the planners take into account Art. II of the Supplementary Protocol to the Agreement on Regional co-operation in combating pollution of the South-East Pacific by hydrocarbons or other harmful substances (Quito 1983), principally the following aspects:

- Allocation of institutional and functional responsibilities for directing and executing operations to prevent, control and clean up spills of contaminant substances;
- Selection of the areas most vulnerable or sensitive to ecological or economic damage;
- Financial and physical resources, such as material and equipment available in the country;
- Arrangements for requesting and using regional assistance, and
- List of personnel and institutions involved in the plan.

To fulfil the foregoing requirements the National Plan should be complemented at least by the following annexes:

- Sensitivity of areas on the Ecuadorian coast and their characteristics
- Inventory of national resources for combating contamination
- List of organisations, authorities and enterprises integrated within the plan

- List of national experts and bodies able to cooperate for implementing the plan

Within a national context these annexes have particular importance to organisations which have responsibilities concerning local and zonal contingency plans, such as Port Authorities and Superintendencies of oil terminals.

#### 4.2 EDUCATION AND TRAINING

To effectively implement the measures for protecting marine and coastal areas the Ecuadorian Maritime Authority should have qualified and expert personnel who carry out the specific functions related to protection of the marine environment. The general public awareness of problems which affect the oceans must also be significantly increased. For these purposes it is essential that well conceived educational and training programmes are developed.

Taking into account the functions that the Ecuadorian Maritime Authority has in the field of preservation of marine areas, this organisation is responsible for carrying out adequate actions to create and develop those programmes. These programmes should be structured to fulfil the educational requirements of the personnel directly involved in tasks related to enforcement of the maritime laws and regulations, and the requirements of the people who directly or indirectly are involved in maritime activities.

In the following sections some guidelines are suggested for education and training programmes needed.

#### 4.2.1 Educational Programme for Personnel of the Maritime Administration

The aim of this programme is to provide essential elements for ensuring an adequate level of knowledge on maritime environmental matters which is mandatory for personnel of the Maritime Administration directly involved in tasks related to protection of the marine environment. Additionally, it can serve as a reference to introduce some marine environmental topics into the curricula of study programmes of the merchant marine educational centres.

The basic topics of this programme are suggested in the following terms:

- a) General characteristics of the marine and coastal area
- b) Specific features of the national territorial sea
- c) The most important marine pollutants
  - Petroleum hydrocarbons
  - Harmful chemical substances
  - Metals
  - Pesticides, etc.
- d) Main sources of marine pollution
  - Land-based discharges
  - Atmosphere
  - Maritime Transportation
  - Dumping
  - Offshore production
- e) The pollution by oil

- f) National legislation on marine environmental matters
  - The Maritime Policy Code
  - The Law for Prevention and Control of the Environmental Contamination
  
- g) Main International Global Conventions on the Control and Prevention of Marine Pollution
  - The UN Convention on the Law of the Sea (1982)
  - The London Dumping Convention (1972)
  - The International Convention on the Prevention of Pollution from Ships (MARPOL 73-78)
  - Convention for the Prevention of Marine Pollution from land-based sources (Paris Convention 1974)
  
- h) Regional Conventions related to prevention of marine pollution
  - Convention for the Protection of the Marine Environment and coastal area of the South-East Pacific (Lima 1981) with its Agreement and Protocols
  
- i) Main global and regional organisations which deal with maritime matters
  - International Maritime Organisation (IMO)
  - Permanent Commission of South Pacific (COPS)
  - Operative Network of Regional Cooperation among Maritime Authorities (ROCRAM)
  
- j) National Organisations which have responsibilities to regulate and control the development of marine and coastal activities.
  
- k) Measures to combat accidental marine pollution
  - The National Contingency Plan.

These topics can be treated with variable intensity according to the characteristics and necessities of the group. Consequently, the duration of the course should be flexible in order to establish adequate programming and to achieve specific goals.

#### 4.2.2 Training activities

To complement the educational programmes it will be appropriate to develop progressive training programmes in order to improve personnel awareness on specific techniques, methods and procedures concerning the nature of their jobs. This is very important for the organisation because personnel with better knowledge and skills are a guarantee for effective performance of the work.

The development and maintenance of training programmes will ensure the achievement of the following main purposes<sup>1</sup>:

- Making the best use of available material resources, equipment and methods
- Standardizing organisational practices and procedures
- Increasing job satisfaction and motivation
- Developing the versatility and employability of human resources
- Maximizing productivity

Concerning the training methods, the following should be considered:



- Formal training at specialized training centres and technical schools
- In-service training based on workshops and training meetings which offer valuable experiences
- On-the-job-training. - this training can be performed by working with other specialists or participating as a team member in marine environmental activities
- Self-training. - this part of the training rests on the responsibility of the employee and reflects his interest and initiative.

These basic considerations on training should be taken into account by the Ecuadorian Maritime Authority to establish training programmes for personnel involved in tasks related to protection of the marine environment. To fulfil the requirements of this personnel, these programmes should consider the following main topics:

- a) The objectives of the organisation on matters related to protection of the marine environment
- b) Marine Contamination:
  - Incidence of contamination on marine flora and fauna;
  - Types of hydrocarbons and behavior of oil spills on the sea;
  - Procedure for taking samples of contaminant spills and its subsequent analysis;
  - Garbage in the marine environment, sources, types and impacts.
- c) Knowledge and utilization of specific materials and equipment to combat marine pollution. Distribution and allocation of available stocks

- d) . Dangerous goods:  
Classification, identification, marking, labelling  
and placarding according to International Maritime  
Dangerous Goods Code (IMDG);  
Sea transport of dangerous goods;  
Handling and Stowage in port areas.
  
- e) Ship inspections:  
Certificates, equipment and general arrangement for  
preventing sea contamination;  
Specific requirements for tankers according to  
MARPOL 73/78.
  
- f) Procedures for investigating of marine pollution  
incidents
  
- g) Procedures for inspecting coastal installations in  
co-ordination with other institutions in order to  
verify the fulfillment of regulations for preventing  
marine pollution
  
- h) Marine environmental aspects in coastal zone  
management.

Additionally, to ensure an adequate and practical  
implementation of contingency plans it will be necessary  
to develop operative training for the personnel involved  
in those plans. This operative training can be improved  
through the following actions:

- a) Performing simulated exercises about marine  
pollution incidents to prove the applicability of  
national, zonal and local contingency plans

- b) Knowledge and practices on methods for containment, recovery, dispersion and clean-up of contaminant substances
- c) Procuring the co-operation of maritime international organisations and its experts for combating marine pollution in order to avail new technology and experience.

#### 4.2.3 Public Awareness

The effectiveness of measures to protect marine and coastal areas from damage by human activities depends on a number of factors, such as the intervention of well trained personnel to ensure the enforcement of regulations, the active participation of users of marine resources and the effective co-operation of the population in general.

To achieve an ample co-operation in the protection of the marine and coastal environment it is necessary to motivate the conscience of the people on matters related to the importance of the oceans and the need to protect them against activities which can cause damage to the marine environment. For this purpose the development of broad educational and public awareness programmes are recommended which should emphasize the importance of the potential public contribution to maintaining a healthy marine environment.

Although in Ecuador many efforts have been made since the eighties to promote and enhance marine educational programmes, it is a real fact that much work remains to be done in extending the development of educational activities. The Ecuadorian Maritime Authority through its organisations, which have responsibilities in

functions concerning protection of marine and coastal areas should participate more actively in the current marine-coastal educational programmes. These programmes mentioned in section 2.4.4 include the participation of authorities of the Ministry of Education and Culture, the General Directorate of Maritime Interests which depends upon the Navy, and delegates of the Programme for Managing Coastal Resources. The planned actions are implemented in the coastal provinces and Galápagos with the co-operation of primary and secondary schools. The author believes that the Captainships of Ports and expert personnel of the General Directorate of the Merchant Marine and Littoral should intervene in activities of these programmes, such as seminars and workshops. The topics to be treated should be related to marine and coastal environmental problems.

Other actions to be taken by the Ecuadorian Maritime Authority for increasing the public awareness on marine environmental issues should be addressed to various sectors of the society with the purpose of covering an ample and significant portion of the population. Another important consideration is the emphasis that should be given to the interrelation between development and environmental protection in order to maintain the public interest on matters which could affect the socio-economic development.

Based on this discernment the following actions are suggested to improve the public awareness:

- a) Provision of regular information to the general public through mass media and special publicity campaigns about the marine environmental and developmental issues

- b) Preparing and proposing marine environmental subjects to be included in school curricula on all levels
- c) Organizing seminars and workshops with representatives of maritime industrial enterprises to highlight the inseparable link between the socio-economic development and protection of the marine environment
- d) Issuing brochures, guidebooks and other short publications aimed at enhancing public awareness of preventing measures to avoid pollution of marine and coastal areas
- e) Structuring programmes of lectures on marine environmental issues to periodically develop in educational centres principally in those which deal with maritime matters, such as Merchant Marine Academy, Naval School and Lyceums, Fishing Schools and Polytechnic
- f) Promoting meetings among national maritime organisations to debate or discuss developmental issues and associated marine environmental problems

#### **4.3 AVAILABILITY OF APPROPRIATE MATERIAL AND FINANCIAL MEANS**

The scarcity of material and equipment and the limitation of funds are impediments for a more forceful environmental protection action in Ecuador. This was highlighted in section 2.4.3 in order to visualize the need for increasing appropriate means to carry out the functions for preserving the marine environment.

Taking into account the intimate correlation between sustainable development and preservation of the marine environment, it is mandatory that the budgets for development plans concerning activities in the marine and coastal areas consider adequate financial resources to implement the measures for protecting the environment. However, given the fact that the resources required are of a great magnitude, unlikely to be met from regular government budgets, it is important that the Maritime Administration channels actions for getting additional financial means from other sources. At a national level these sources could be oil and fishing enterprises, Port Authorities and agencies dealing with environmental issues.

Another mechanism that can be managed is the exchange of a portion of the external debt of the country for investment in specific projects addressed toward the preservation of marine resources. In this respect a previous operation was made in April 1989 between the World Wildlife Fund, and Nature Conservancy as one party and Fundacion Natura and the Ecuadorian Government as the other party<sup>a</sup>.

In accordance with current necessities, the financial resources should be utilized to

- a) Acquire equipment and materials required for technical laboratories in order to ensure the effectiveness of the research and analysis tasks;
- b) Develop educational and training programmes, and implement publicity campaigns;
- c) Develop a medium term project for providing the essential elements for surveillance and monitoring of marine activities. These should include mobile means and fixed stations with appropriate communication systems;

- d) Acquire material and equipment for fulfilling the requirements of the contingency plans. Annex B contains Guidelines for listing response equipment, extracted from IMO Publication 1988 entitled: Manual on Oil Pollution Section II Contingency Planning. The types and quantities of these elements should be established after assessing the existing capabilities, the characteristics of the geographical areas for use and the current available technology.

#### 4.4 COASTAL ZONE MANAGEMENT ASPECTS

In recent years Coastal Zone Management (CZM) has become widely recognized as a relevant developmental and environmental issue because the coastal zone is a valuable component of the marine environment where many human activities develop. This zone constitutes the interface between terrestrial and marine areas for which some conflicts and jurisdictional sensitivities exist as constraints to the adequate managing of coastal areas. The scale, the interconnected nature and the unfamiliarity of marine systems make many of the management issues very different from those of most terrestrial areas. For this reason the creation of specific programmes for managing the coastal resources is a real necessity in order to fulfil the requirements for protecting both marine and terrestrial areas in the coastal zone.

Taking into account the aims of this study, it is necessary to emphasize some marine environmental aspects which have previously been mentioned. First of all, the increasing amount of waste generated by the industrial, agriculture and urbanizational development along the coastline is a cause for concern.

Another aspect is the danger to marine ecosystems that occurs particularly in the shallow coastal fringes where potentially harmful activities are carried out, such as dredging, causeway construction, mariculture ponds development, and port development.

In estuaries and in tropical areas, such as coral reefs and mangroves where resources and human populations may be highly concentrated, overexploitation of coastal resources could have serious consequences for the integrity of the coastal environment.

As was mentioned in section 3.4.3 (b) Ecuador has continuously developed efforts to adequately manage coastal resources through a specific programme in which the Maritime Authority participates. However, it is important that all organisations involved in this programme appoint qualified personnel to support the implementation of practical actions. These personnel should know the procedures to carry out assessments of the coastal zone, and the basic elements for planning the rational use of the resources, taking into account that an inadequate exploitation can affect sustainable development and preservation of the environment.

To effectively participate in assessing and planning tasks, the personnel involved should understand the limitations and opportunities for the range of possible activities which can develop within the various sectors of the coastal zone. An appropriate analysis of these limitations and opportunities can help to identify the extent that activities in a coastal zone could co-exist without prejudice among them. According to R. Kenchington<sup>2</sup>, the following list of activities may be considered in this analysis for a coastal area:



Preservation of undisturbed natural environment  
Protection of breeding area of endangered species  
Protection of breeding area of commercially  
important species  
Scientific research  
Recreation and tourism (including construction of  
facilities)  
Fishing (subsistence and commercial)  
Mariculture  
Shipping  
Extraction of construction materials  
Dredging of navigation channels  
Residential Construction  
Light and heavy industry  
Coastal and seabed mining  
Hydrocarbon drilling  
Sewage disposal (Domestic and industrial)  
Solid waste dumping  
Harbor, marina or breakwater construction.

Based on the foregoing considerations, the Ecuadorian Maritime Authority should intervene in programmes which deal with planning, development and managing of coastal zones with a view to addressing the protection of these zones against pollution. The principal justification of this is that pollution from land-based sources is at present the single most important threat to the marine environment and impediment to the use and sustainable development of the oceans and coastal areas, and their resources. Additionally, the country has obligations to implement provisions of the Protocol for the Protection of the South-East Pacific against pollution from land-based sources (Quito 1983) which is a supplementary document to the Convention for the Protection of the Marine Environment and Coastal Area of the South-East Pacific (Lima 1981).

With the purpose of ensuring effective participation and practical co-operation in activities related to coastal zone management the following actions are suggested to be performed by the Maritime Authority:

- a) Maintaining up to date development plans for commercial and fishing ports;
- b) Determining operative areas for oil terminals and facilities for tanker operations;
- c) Reviewing present authorizations for using shore zones in order to verify that they do not interfere with the programmes for managing coastal resources. Special attention should be given to authorizations for mariculture activities;
- d) Studying projects related to construction of marinas, breakwaters, piers, jetties and other offshore structures in view of their physical impact on the coastline;
- e) Carrying out regular environmental assessment of the state of the environment of shores and near shore waters with support of technical institutions;
- f) Applying preventive and precautionary measures to avoid degradation of the coastal environment and to reduce the risk of marine contamination along the coast;
- g) Promoting and facilitating development and training of its personnel involved in programmes for management coastal resources;
- h) Appointing expert personnel to permanently work in the captainships of ports as coordinators within the framework of programmes for management of coastal resources;
- i) Developing and maintaining databases of the hydrographic characteristics of coastal areas and islands with support of technical institutions;

The development and implementation of these suggested actions will constitute a positive benefit for adequate management of coastal areas. The intervention of the Maritime Authority, as a regulatory body, will contribute to solving the problems arising from the pollution of coastal waters due to the continuous increase of uses of the coast and the consequent pressure applied to the coastline.

#### 4.5 STRENGTHENING OF GLOBAL AND REGIONAL CO-OPERATION

The sole existence of global and regional agreements and conventions to protect the marine and coastal environment is not the remedy for solving the current problems that affect the oceans. Therefore, broad adherence to them and strict application of their provisions will considerably contribute to the implementation of effective measures to protect marine and coastal areas. With the degradation of the marine and coastal environment being a global problem, it cannot be solved by individual countries without effective international co-operation although solutions should be primarily sought through feasible national actions.

To emphasize this statement it is important to mention that Agenda 21 of the U.N Conference on Environment and Development (Rio Conference 1992) contains a specific programme area entitled "Strengthening international, including regional, cooperation and co-ordination" which specifically establishes that:\*

It is recognized that the role of international co-operation is to support and supplement national efforts. Implementation of strategies and activities under the programme areas relative to marine and coastal areas and seas requires effective institutional arrangements at national, subregional, regional and global levels, as appropriate.

In this context, with Ecuador being a member of IMO and signatory to most of the global conventions and one specific regional convention related to preservation of the marine environment, it should develop active efforts to implement the provisions of these international agreements and to get effective co-operation from maritime organisations and specialized agencies which deal with environmental matters. This co-operation should principally be related to transfer of technology, experience and data, provision of training, as well as financial assistance.

With the purpose to specify the actions that the Ecuadorian Maritime Administration should carry out to co-operate at global and regional levels and to get in turn a reciprocal co-operation of international organisations, the following suggestions are made:

- a) Completing the studies of global conventions on marine environmental matters to which the country is not party with the aim to access or ratify them. Special mention is made to the International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC Convention);

- b) Studying the feasibility to implement the provisions for land facilities to receive waste from ships according MARPOL 73/78 Convention;
- c) Arranging for periodic exercises for proving contingency plans, among neighboring countries;
- d) Promoting exchange of information on marine and coastal issues at a regional level;
- e) Participating in relevant international meetings related to protection and preservation of the marine environment;
- f) Providing information on programmes and research which the country is conducting for preventing marine pollution as well as the results of such programmes and research;
- g) Getting assistance of international organisations, such as IMO and UNEP, through practical memoranda of understanding to improve the national capabilities for preventing, reducing and controlling marine pollution;

Such assistance would include

- Training of scientific and technical personnel
- Facilitation of the participation in relevant international programmes
- Acquisition, - utilization and maintenance of appropriate material and equipment
- Advise on facilities for education, training and research programmes

- h) Executing tasks imposed by the Action Plan of the South-East Pacific under the umbrella of the Regional Seas Programmes of UNEP and the Lima Convention (1981) mentioned in section 3.4.3 (c) with special treatment given to the resolutions taken in periodical meetings of this Plan in order to implement them in practical manner;
- i) Implementing the resolutions of the Operative Network for Regional Co-operation among Maritime Authorities (ROCRAM) concerning maritime environmental matters.

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2. Desarrollo y Medio Ambiente en América Latina y el Caribe: Una visión Evolutiva (publication of the Spanish Ministry of Public Works and Urbanism-1990 p.220)
3. R.A. Kenchington, Managing Marine Environments, Taylor Francis, New York 1990 p. 89-90
4. Agenda 21 (Rio Conference 1992), Chapter 17 Protection of Oceans.

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 CONCLUSIONS

- a) The decisive role that the oceans play in the world has relevant influence on development of nations because they constitute a potential source of living and non living resources to satisfy the growing human needs for food and industrial necessities. Additionally, they serve as a natural element in the development of maritime transport, which in turn facilitates the world trade.
  
- b) The understanding of the marine environment as a complex system and the assessment of interrelationships among its components is a prerequisite for identification of the problems which can arise in maritime and coastal areas. An appropriate evaluation of the manner in which these problems affect the marine environment will facilitate the implementation of preventive measures and management systems to protect marine resources.

- c) Ample and effective co-operation between sea users and national organisations directly involved in the maritime administration and in matters related to preservation of the marine environment is of vital importance when implementing regulatory measures to control maritime activities.
  
- d) Given the fact that around three quarters of marine pollution comes directly from land-based sources and the other quarter from shipping activities and waste disposal at sea, the participation of the maritime administration of a country in the attempt to control pollution from land-based sources located near the coastline will constitute an effective support to other organisations interested in protecting coastal zones. This participation is complementary to its primary responsibilities to regulate and control shipping activities and offshore operations.
  
- e) Among marine pollutants oil constitutes a potential risk for the marine environment because it is widely utilized for industrial processes and approximately half of the global production of crude oil is transported by sea. Oil spread on marine areas causes adverse effects on natural sea resources for which it is necessary to regulate and control vessel operations and industrial discharges.
  
- f) The excessive and irrational exploitation of marine living resources can adversely influence the natural development of marine species. Consequently, certain areas of the marine environment could lose their importance as a source of food for human needs.



Additionally, the destruction of certain coastal resources, such as mangroves, will affect the integrity of coastal ecosystems.

- g) The provisions, regulations and recommendations derived from global and regional agreements on matters related to protection of the marine environment are of great value for maritime countries. Common parameters will facilitate an adequate and harmonic performance of the national maritime administration in controlling maritime activities.
- h) Well conceived education and training programmes for personnel directly involved in administrative and operative tasks for preserving the marine environment are essential in creating a context in which the intervention of qualified personnel will guarantee the performance of the organisation as a whole. Furthermore, the initiatives to increase public awareness of nature, extent and implications of the problems which affect marine and coastal areas will favorably contribute to implementing regulatory measures for protecting these areas.
- i) The extensive Ecuadorian maritime area, the fertile coastal line and the important Galápagos Islands are of great significance for national development because they contain valuable natural resources. Therefore, the national maritime authority has the great responsibility to implement the necessary regulatory measures in order to protect the marine environment in co-ordination with other organisations which control maritime and coastal activities.

- j) In general the Ecuadorian legislation related to the exploitation of natural resources, including those of marine and coastal areas, has regulations for protecting the environment. However, it is necessary to establish co-ordination mechanisms in order to facilitate the performance of the responsible organisations. This is essential in the maritime field in order to avoid administrative interferences and to improve control measures, particularly in the Galápagos Islands, and in some coastal areas where the mariculture has developed.
- k) The intensive human activities along the Ecuadorian coastal zone and sometimes the effects of natural phenomena have been the cause for degradation of important sectors of the coastline, negatively affecting the natural equilibrium of coastal ecosystems.
- l) Due to intensive shipping activities and the existence of industries and oil terminals along the Ecuadorian coast, the risks of marine pollution are always present in the marine area. Therefore, the maritime authority should perform effective actions to regulate and control these activities and to combat the effects of maritime incidents.
- m) Despite the willingness of Ecuador to implement control measures for protecting the marine environment, it should be emphasized that due to economic limitations of the country, there is not enough financial support to complement its present capabilities as regards material and equipment necessary for surveillance and monitoring of maritime activities and to combat sea pollution.

The scarcity of funds is also an impediment when attempting to resolve the problems related to shortage of expert personnel in maritime environmental matters.

- n) The functions of the Ecuadorian Maritime Administration are important in regulating and promoting maritime activities with due regard to preservation of the marine environment. However, it is necessary to point out that regulatory measures to protect marine and coastal areas should not be relegated as a matter of secondary importance because these areas constitute a valuable source of natural resources necessary for the development of the country. Additionally, as Ecuador is a signatory of international agreements related to protection of the marine environment, it has obligations to implement provisions of those agreements.
- o) The Maritime Administration of countries, such as Spain and Sweden has responsibilities in connection with protection of the marine environment. The administrative and operative tasks are carried out with effective co-ordination among the organisations involved. In Sweden, the Coast Guard and in Spain a specific society for salvage and maritime safety carry out actions of surveillance, monitoring and combating marine pollution. This is of benefit to visualize the means to optimize the performance of national organisations, and to know new organisational structures and procedures for dealing with environmental issues.

p) The structure of the Ecuadorian Maritime Administration includes the General Directorate of Merchant Marine and Littoral (DIGMER), which is the executive arm for the policy of aquatic transport. One of the functions of this Directorate is to exercise the control of sea and river contamination. To perform this function the internal organisational framework contemplates a department named Department for Prevention and Control of Sea Pollution. However, this department is relatively weak due to its limited human and material resources. Therefore, it is difficult to take all the necessary actions to effectively meet the requirements for protecting the marine environment over the extensive area of its jurisdiction.

q) Despite the limitations of resources, the DIGMER constantly endeavors to comply with its requirements to preserve maritime and coastal areas. The elaboration of the National Contingency Plan for Hydrocarbon spills and the effective participation in the Programme for Managing Coastal Resources are samples of its efforts. Furthermore, the commitments of Ecuador at the global and regional levels are implemented according to the relevant provisions.

These activities positively contribute to improving the protection of the marine environment in Ecuador.

## 5.2 GENERAL RECOMMENDATION

Taking into account the conclusions of this study and the suggested measures to improve protection of the marine environment in Ecuador, included in Chapter IV, the general recommendation that the author establishes is that the Ecuadorian Maritime Authority should analyse the feasibility of these measures in order to define priorities for their implementation.

Due consideration should be given to present resources available and to the possibility of obtaining additional financial means to solve basic necessities of the organisation as regards material and equipment for controlling pollution of marine and coastal areas. However, it is recommended that initial actions should be taken to strengthen the Department for Prevention and Control of Sea Pollution, and to implement educational and training programmes on maritime environmental matters for personnel of the organisation.

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(1992)

ANNEX "A"

RELEVANT ASPECTS OF INTERNATIONAL CONVENTIONS,  
CONFERENCES, STUDIES AND PROGRAMMES ON MATTERS  
RELATED TO PROTECTION OF THE  
MARINE ENVIRONMENT

1. International instruments before the Stockholm Conference (1972)
  - International Conventions for the Prevention of Pollution of the Sea by Oil (London 1954)
  - Convention on the High Seas, Geneva 1958 (Art.24,25)
  - International Convention Relating to Intervention on the High Sea in Cases of Oil Pollution Casualties (Brussels 1969)
  - International Convention on Civil Liability for Oil Pollution Damage (Brussels 1969)
  - International Convention on the Establishment of an International Fund for Oil Pollution Damage (Brussels 1971)
  
2. The Stockholm Conference (1972), thus called the UN Conference on the Human Environment held in Stockholm-Sweden from 6 to 16 June 1972. The purpose of this Conference was to create a basis for comprehensive considerations of the problem of the human environment. Action to protect the marine environment was one of the

priorities.

3. The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters (London December 29, 1972). The principal considerations are stipulated in the Article I as follows:

"Contracting Parties shall individually and collectively promote the effective control of all sources of pollution of the marine environment, and pledge themselves especially to take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea".

4. Convention for the Prevention of Pollution from Land-Based Sources (Paris June 4, 1974). The Article I establishes that:

(1) "The Contracting Parties pledge themselves to take all possible steps to prevent pollution of the sea, by which is meant the introduction by man, directly or indirectly, of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as hazards to human health, harm to living resources and to marine eco-systems, damage to amenities or interference with other legitimate uses of the sea".

(2) "The Contracting Parties shall adopt individually and jointly measures to combat marine pollution from land-based sources in accordance with the provisions of the present convention and shall harmonize their policies in this regard".

5. International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 - generally known as MARPOL 73/78, was prepared by IMO and signed in London. This Convention covers all the technical aspects of pollution from ships, except disposal of land generated wastes into the sea by dumping. The provisions apply to ships of all types and fixed or floating platforms operating in the marine environment. The Convention does not, however, apply to pollution directly arising out the exploration and exploitation of sea-bed mineral resources. The five Annexes included cover aspects related to prevention of pollution by different substances or materials, namely oil, harmful substances, noxious liquid substances in bulk, sewage and garbage.

This Convention entered into force on 2 October 1983.

6. International Convention for the Safety of Life at Sea, 1974 - generally known as the SOLAS Convention, was also prepared by IMO and signed in London. It has a significant role concerning the protection of marine environment because specific chapters related to safety of navigation and carriage of dangerous goods are included.

7. In 1974 the UNEP structured a Regional Seas Programme in order to organize regional agreements on marine pollution. Since the first agreement on the Mediterranean (1974), the Programme has grown to cover ten regional seas and to involve more than one hundred countries. The corresponding Action Plans have been developed to provide an appropriate framework for the establishment of a suitable comprehensive policy which will enable them to achieve the objectives related to protect the marine environment and coastal areas.

8. The UN Convention on the Law of the Sea (UNCLOS 1982) signed in Montego Bay, Jamaica but still not in force; it represents a major step forward an integrated management regime for the oceans. Specially, the Part XII of the Convention provides a broad outline for action concerning the prevention of marine pollution from all sources at global level.

9. International Guidelines on the Protection of the Marine Environment against Pollution from Land-Based Sources (Montreal Guidelines).

It constitutes a further initiative taken by UNEP soon after of UNCLOS 1982 aimed at the control of marine pollution from land-based sources.

This set of guidelines drawn up in 1985 can help nations develop international agreements and national legislation to protect the marine environment. These guidelines contain basic provisions from which nations might select or adapt elements to suit their specific needs.

10. In 1987 the World Commission on Environment and Development which was conformed by the UN, published its report entitled "Our Common Future" that contains a deep analysis of environmental, development and peace issues. In its pages are consigned a clear concept of "sustainable development" and realistic proposals to address the critical environmental and development problems; additionally it suggests new forms of international co-operation.

A specific section of this report deals with the oceans, emphasizing their importance and the necessity of their conservation.

11. The International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC).

It was prepared by IMO with the purpose to provide a global framework for international cooperation in combating major incidents or threats of marine pollution. Parties to the convention will be required to establish measures for dealing with pollution incidents.

12. The global Programme for the Protection of the Marine Environment developed by IMO, whose guiding philosophy is the "anticipate and prevent" approach advocated by the report of the World Commission on Environment and Development. The Programme contains a series of activities such as, advisory services, fellowships, seminars and information services.

The main feature is training. However, activities aimed at identifying the problems and risks that developing countries face in the field of marine environment protection, play an important role.

13. The UN Conference on Environment and Development (UNCED-92), held in Rio de Janeiro, Brazil, on June 1992 coinciding with the 20 anniversary of Stockholm Conference (1972).

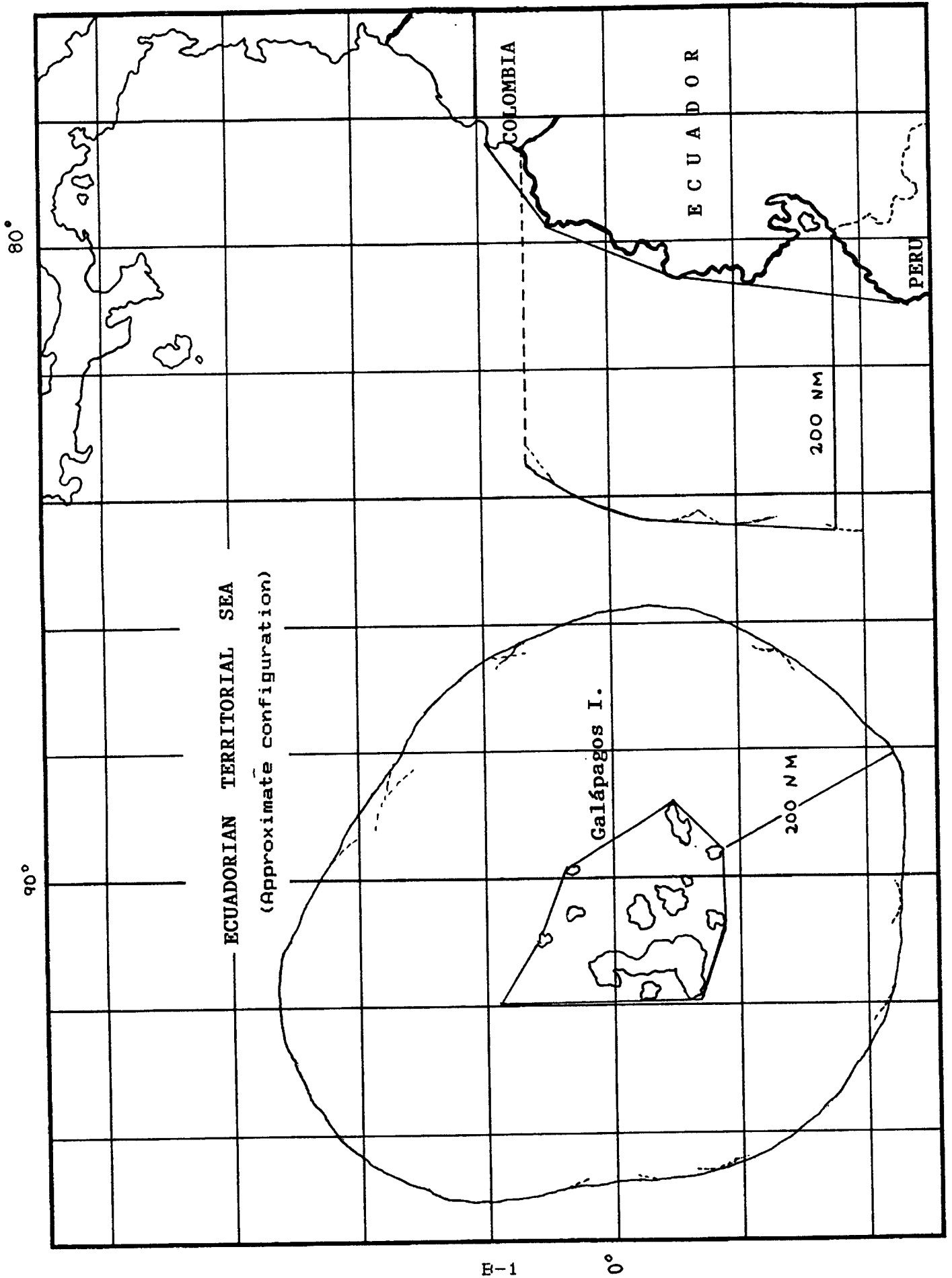
Called the "Earth's Summit", it was the largest scale and highest level conference in the history of UN, in which the starting point of a new mentality was marked in order to prevent to the governments about the problems of the environment degradation.

The two conventions adopted in the conference deal with climate change and biodiversity. Two further text were adopted, namely the Rio Declaration on Environment and Development which contains 27 fundamental principles to achieving environmentally sustainable development, and Agenda 21 that is a comprehensive plan of action for the global community extending to the next century.

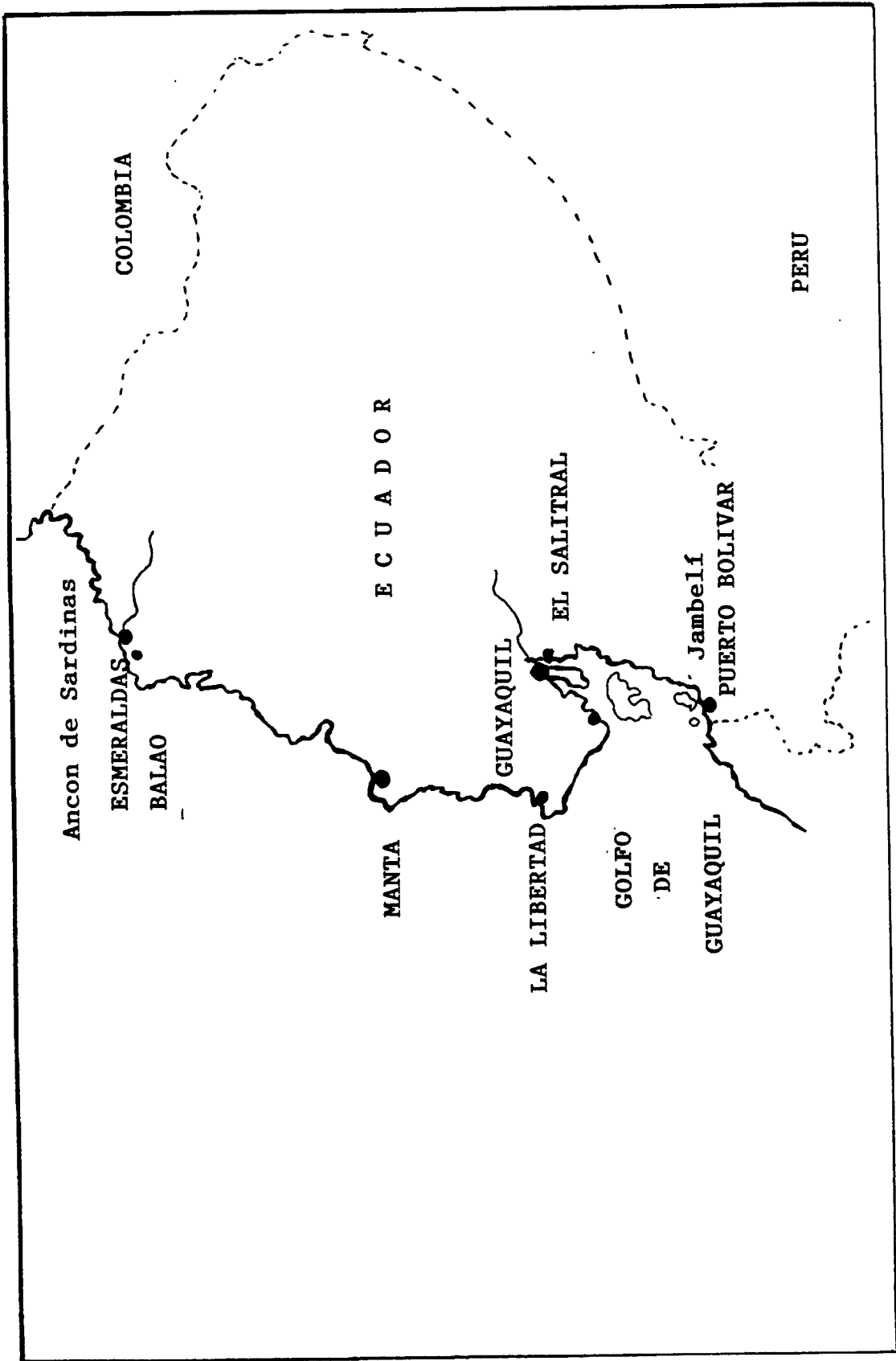
This Agenda provides guidelines to prevent further environmental degradation. Its chapter 17 dealing with Protection of the Oceans, all kind of Seas, included enclosed and semi-enclosed seas, and Coastal Areas and the Protection, rational use and development of their living resource. This chapter contains seven programme areas in order to identify new approaches to marine and coastal area management and development; one of these programmes refers specifically to marine environment protection.



ANNEX "B"



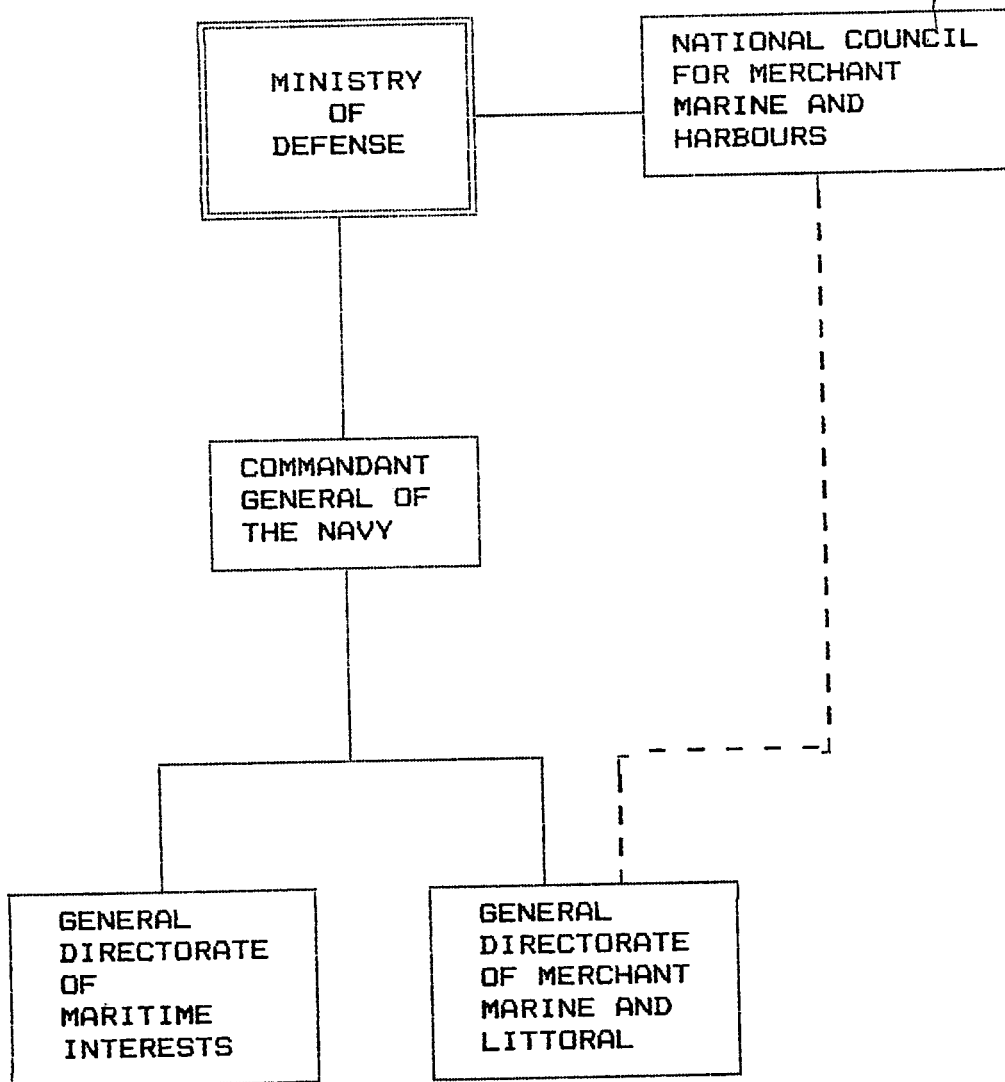
E C U A D O R I A N C O A S T





ANNEX "C"

PRINCIPAL BODIES INVOLVED IN  
MARITIME ADMINISTRATIVE ACTIVITIES



ANNEX "D"

GUIDELINES FOR LISTING RESPONSE  
EQUIPMENT \*

1.- Booms

- For use in open sea or sheltered water operations
- Total length
- Additional support equipment necessary
- Means of transportation required

2.- Skimmers and other pick-up devices

- Types and total numbers
- Additional support equipment necessary
- Means of transportation required

3.- Equipment for containing oil

- Types, total numbers/capacity

4.- Specialized shoreline clean-up equipment

5.- Specialized vessels

- Type, length, breadth, speed
- On board storage capacity
- Application (open sea or sheltered waters)

6.- Dispersant

- Types, total stock of type
- Types of spraying equipment required
- Toxicity and efficiency data
- System of storage

**7.- Vessel and aircraft dispersant spraying equipment**

- Design or intended use

**8.- Lightering equipment**

- Pumps, total stocks by type/capacity and weight
- Hoses, length, diameter
- Fenders, total stocks by type/size and weight

**9.- Communications and auxiliary equipment**

- Equipment on board
- Portable equipment (on board and ashore)
- Frequencies
- Types of emission
- Power source

\* Extracted from Manual On Oil Pollution, section II  
Contingency Planning (IMO Publication 1988).