

ANNEX 12

RESOLUTION MEPC.106(49)

Adopted on 18 July 2003

**DESIGNATION OF THE PARACAS NATIONAL RESERVE
AS A PARTICULARLY SENSITIVE SEA AREA**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

BEING AWARE of the ecological, social, cultural and educational value of the Paracas National Reserve, as well as its vulnerability to damage by international shipping traffic and activities in the area and the steps taken by Peru to address that vulnerability,

NOTING that the Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas adopted under resolution A.927(22) set out procedures for the designation of Particularly Sensitive Sea Areas,

HAVING CONSIDERED the proposal from Peru to designate the Paracas National Reserve as a Particularly Sensitive Sea Area,

HAVING AGREED that the criteria for the identification of a Particularly Sensitive Sea Area provided in resolution A.927(22) are fulfilled for the Paracas National Reserve,

NOTING that the forty-ninth session of the NAV Sub-Committee considered an Area to be Avoided (ATBA) and agreed to its establishment,

1. DESIGNATES the Paracas National Reserve as defined in the Annex to this resolution as a Particularly Sensitive Sea Area.

ANNEX

DESIGNATION OF THE SEA AREA OF THE PARACAS NATIONAL RESERVE - PERU AS A PARTICULARLY SENSITIVE SEA AREA

INTRODUCTION

1 The use of ships to transport cargoes of various types and volumes, especially goods and substances which are harmful and damaging to the marine environment, and for the extraction and capture of hydrobiological resources, represents a serious threat to the marine environment due to the possibility of spills or operational or accidental pollution resulting in irreversible damage to marine habitats and organisms.

2 The Peruvian Sea is one of the world's richest in hydrobiological resources thanks to the favourable oceanographic and climatic conditions off the coast of Peru. The Paracas National Reserve occupies a unique geographical area along its entire shore, since it possesses significant biodiversity, both hydrobiological species and marine mammals, birds and other species.

3 The importance of the Paracas National Reserve has been internationally recognized by the Convention on Wetlands of International Importance (RAMSAR Convention) and the Hemispheric Shorebird Reserve Network, since the Peruvian Maritime Authority established special protective measures.

4 The Government of Peru is seeking via the International Maritime Organization to obtain world recognition of the sea area of the Paracas National Reserve as a particularly sensitive sea area, in accordance with the established procedures, so that seafarers, irrespective of the flag under which their ship is registered, are aware of the special ecological importance of this area and provide it with due protection, thus contributing to the efforts by the entire people of Peru in this respect.

PART I - DESCRIPTION, IMPORTANCE AND VULNERABILITY OF THE AREA

1 DESCRIPTION OF THE PARACAS NATIONAL RESERVE

1.1 The Paracas National Reserve is an area of high ecological value and environmentally sensitive, located in Pisco Province, Department of Ica, in a sea and coastal area defined by the following geographical points, as shown in Chart PERU HIDRONAV-2170, "Coast of Peru: Pisco-Paracas-Bahía Independencia", annexed to this document:

(a)	13°46'52" South	76°30'00" West
(b)	13°46'52" South	76°17'40" West
(c)	13°47'20" South	76°17'40" West
(d)	13°49'00" South	76°18'25" West
(e)	13°51'26" South	76°14'55" West
(f)	14°26'42" South	76°00'00" West
(g)	14°26'42" South	76°30'00" West

- 1.2 The sea area of the Paracas National Reserve has a total area of 217,594 hectares, including several islands, the main ones being:
 - (a) Isla San Gallán
 - (b) Islas Ballestas
 - (c) Islas Independencia group.
- 1.3 The Paracas National Reserve is the only marine reserve in Peru. It was created by Supreme Decree No.1281-75-AG of 25 September 1975, and includes within its boundaries the Paracas National Prehistoric Park, designated by Supreme Decree No.15 of 21 June 1960.
- 1.4 The Reserve was created to preserve and sustainably use representative samples of the natural formations and the biological diversity in the bio geographical areas (Udvardy, 1980) of the Pacific subtropical desert and the Pacific temperate desert, or according to another classification of zoogeographic regions: the Peru-Chilean Oceanic Zone and the Coastal Desert (Brack, 1976).
- 1.5 Due to the high primary productivity, it concentrates significant nuclei of terrestrial and aquatic fauna, notably the large seal populations, the high density of guano birds and the abundance of migratory birds, making it an area of particular economic and ecological interest, which combined with the Paracas culture form an area of great scientific and cultural significance and great tourist potential.
- 1.6 The coastline is varied, marked by geographical features such as the Bay of Paracas, the peninsula of Paracas, Punta Carreta, Bahía de la Independencia, Morro Quemado, Punta Gallinazo and the Islas Independencia and San Gallán.
- 1.7 These features are the result of diastrophic forces active now and in the past in Peru. The drowning of the palaeozoic range known as the "Cordillera de la Costa" is clear from observation of the Bahía de la Independencia and the group of islands bearing the same name, or the Peninsula of Paracas and Isla San Gallán. The shorelines corresponding to the high ground along the same coast are all steep, further evidence of the drowning.
- 1.8 The climate is conducive to the formation of subtropical desert, meaning that there is a difference of about 6° to 8° in the average temperature between the hottest and the coldest months. In February and August, it is 22°C and 15.5°C respectively, with an annual average of 18.7°C. Precipitation is very low. The average annual total in the north of the Reserve is 1.83 mm with relative humidity of 82 per cent and 83 per cent in winter.
- 1.9 The average height of cloud is 590 metres, and it should be noted that unlike in other parts of the coast, the sun also shines in winter, which can be explained by the fact that the beaches and plains of the Reserve, by reducing the relative humidity, disperse clouds by reflecting the heat induced on the surface by infrared rays and rising warm air.

- 1.10 The prevailing winds are south and south-west, reaching an average speed of 14.9 km/h. However, the strongest shore winds, known as "Paraca" reach 32 km/h.
- 1.11 The Bay of Paracas is shallow, ranging from 0 to 7 metres in depth, but deeper in the vicinity of Punta Pejerrey.
- 1.12 The principal productive activity in the area is fishing, both industrial and small-scale, including fish-farming, with barges and wharves for direct unloading of hydrobiological products. The biodiversity, beautiful scenery and archaeological sites in the Reserve make it an important tourist destination (over 120,000 visitors a year).
- 1.13 Also located in the Bay of Paracas is a port terminal for large ships, handling different types of cargoes for export, import and coastal trade, especially fish meal, salt and sulphuric acid, as well as a multi-buoy off-shore terminal for supplying oil from tankers to the refinery which provides fuel for the region.
- 1.14 There is merchant shipping and tanker traffic bound for other ports in and around the sea area of the Reserve.

2 IMPORTANCE OF THE PARACAS NATIONAL RESERVE

2.1 Ecological criteria

2.1.1 Unique and representative character

- 2.1.1.1 This section of the coastal and sea area includes the sea area of the Paracas National Reserve. Its characteristics make it quite unique and exceptional compared with many areas of the Peruvian coast. It is important for its upwelling currents and its physical and environmental conditions make it one of the most productive and diverse areas of the coast.
- 2.1.1.2 While from latitude 5° South, off Bayovar, Piura, the coastal region offers these ecological characteristics, a series of factors combine in the area south of Pisco to produce the extraordinary wealth of environments and marine species. The Peru current brings a constant supply of inorganic nutrients, the richest in the world, to the coast off San Juan de Marcona. These nutrients provide a high concentration of raw materials, mainly phytoplankton, which are the basis of the rich shore and aquatic fauna found there. This makes the coastal waters of Pisco-Paracas one of the most productive in the world.
- 2.1.1.3 The first area touched by the current is the Bahía de la Independencia, where the concentration of nutrients results in an exceptional wealth of hydrobiological life which is reflected, among other things, in the rich harvests of molluscs. The south side of the Peninsula of Paracas to some extent hinders the South to North flow and gives rise to an area where the cold water from the South mixes with the local warm waters, which then flow north-west.
- 2.1.1.4 The Bay of Paracas has shallow waters which are easily heated by the sun's rays. These waters receive a variable but constant inflow of fresh water from the Río Pisco, greater mainly during the summer months, which reduces their salinity.

- 2.1.1.5 The wealth of biological resources within the Reserve is thus supported by the dynamics of the marine ecosystem, both in the benthic and pelagic populations. It concentrates both a wide diversity of species and considerable commercial volumes due to the physical features of the coast with its many small bays and creeks, shallow open beaches and many cliffs. The shallowness of the coastal waters encourages photosynthetic processes or primary productivity of phytoplankton and algae which start the trophic chain. The cold Peruvian Current and the submarine counter-currents encourage the upwelling of masses of water from the seabed to the surface, laden with nutrients on which phytoplankton and macroscopic algae feed in the extremely sunny conditions. This generates an explosion of its biomass through photosynthetic activity, starting the trophic chain which makes the sea of Paracas one of the richest in the world.
- 2.1.1.6 The benthic population of the waters of the Paracas Reserve consists mainly of a great biological diversity of molluscs, algae, fish and arthropods, especially mussels, winkles, scallops, sole, cabrilla, pintadilla, chita, etc. as well as various species of marine algae. These species form the basis of the country's fish-farming, using techniques specific to the area. The pelagic population consists of wild species, especially anchovies, mackerel, sardines, silverside, machete and bonito.
- 2.1.1.7 The wide biological diversity of the benthic and pelagic ecological populations of the sea of Paracas also depends on the nature and variety of the substratum (sand, mud, sandy mud, rock, stony, shells, etc.), tidal movements, (with species living at the lower, middle and upper shore levels) and the physical and chemical composition of the sea water which encourages primary growth which is the basis of the biological chain in the Peruvian sea.

2.1.2 Productivity

- 2.1.2.1 Despite its tropical position, the most striking characteristic of the Peruvian Sea is its cold waters. This coldness is the result of the vertical stream of water from deeper layers to the surface, by the process known as the Peruvian upwelling system, which is summarized below.
- 2.1.2.2 The coastal area of the Peruvian Sea is considered to be one of the most productive in the world. The trade winds drive the coastal waters of Peru from south-east to north-west. This circulation is called the Peruvian Coastal Current. The direction and strength of the wind and the geographical shape of the west coast of the continent cause a bend in the coastal waters at right angles to the wind direction and against the coastline. This bend leaves a "void" which is filled by the upwelling of subsurface waters rich in inorganic nutrients. This extra provision of nutrients and the action of sunlight are the basis for the high phytoplanktonic and zooplanktonic productivity, which in turn sustains the famous riches of the Peruvian Sea.

2.1.3 Diversity

2.1.3.1 The diversity of coastal micro environments, the geographical shape of its coastline, the variety of substrata and the high primary productivity of these waters support a wide variety of species which offer, in practice and potentially, a large number of alternatives for sustainable local and national development.

GROUP	SPECIFIC DIVERSITY (1)
Algae	317
Terrestrial plants	54
Anelides	109
Molluscs	194
Marine arthropods	286
Terrestrial arthropods	129
Other invertebrates	101
Fish	168
Reptiles	10
Birds	216
Mammals	36
TOTAL	1543

Source: INRENA - January 2000

2.1.3.2 Invertebrates should be highlighted among the most important resources, of which arthropods are the most varied and molluscs offer the best prospects for farming. The most representative species include scallops, *argopecten purpuratus*, for its great economic potential, and abalone (*concholepas concholepas*), the wedge clam (*donax sp.*), the Pacific clam (*gari solida*), the mussel (*aulacomya ater*), the octopus (*octopus sp.*). Other groups of invertebrates are also important, such as equinoderms, including the sea urchin (*loxechinus albus*) and crustaceans such as the crab (*platyxanthus orbigny*), both of which are of economic importance and constantly harvested.

2.1.3.3 Plants are another important group. Algae, for example, are a raw material in pharmaceutical research and the pharmaceutical industry as well as a traditional source of human food. Also noteworthy is the seasonal vegetation, basically herbaceous, which grows on the slopes of the hills nearest the coast which rise to over 400 metres. This "coastal hill" vegetation, is encouraged by the occurrence of winter mists. In general, little is known of these formations which in the Paracas National Reserve at least occur in the Lechuza hills, Morro Quemado and San Gallán Island.

2.1.3.4 The third important group consists of vertebrates. Fish are the traditional basic resource of the local economy, not only in domestic and small-scale fishing, but also industrial. The periodic appearance of sea turtles is a cause for concern since it leads to the hunting of and resulting trade in these animals, despite the fact that it is a prohibited activity. In addition, the wide diversity of migratory and resident birds, marine mammals (seals, whales and otters) are a great attraction for students, teachers, researchers and tourists.

Flora

- 2.1.3.5 The terrestrial flora of the Paracas Reserve are divided between local biotopes in the uplands called coastal hill vegetation and those growing on the shores, known as halophytic plants. The Paracas coastal desert is characterized by high temperatures and scant precipitation, with heights of 500 metres above sea level in the Peninsula of Paracas and 600 metres above sea level in the Bahía de la Independencia, which capture the humidity in the mists encouraging the presence of hill vegetation.
- 2.1.3.6 In the Lechuza and Lagarto hills in the Bay of Paracas and San Gallán Island there are sandy soils with three species of *tillandsia sp.*, xerophytic plants which grow in the sandy substratum and capture atmospheric humidity.
- 2.1.3.7 In the stony soils there are fissures and crevices which collect humus, lichens and mosses, which allow the growth of the species *solanum*, *oxalis* and *spergularia*. These species dry out in summer and grow again in winter by capturing the humidity. The hill vegetation occupies very limited areas and has been altered by the local beachcombers known as *guaqueros*.
- 2.1.3.8 Halophytic species grow along the shorelines. In the Bay of Paracas, Playón and Mendieta, the species *sesuvium portulacastrum*, *distichlis spicata* and *cressa truxillensis* can be found.
- 2.1.3.9 The marine flora consists of microscopic algae and larger seaweed (Acosta, 1977). 254 species of marine algae are recorded in the area, 3 species of *cyanophytas*, 11 *phaeophytas*, 1 *euglenophyta*, 79 *pirrophytas*, 104 *criosphytas* and 44 *rodophytas*.
- 2.1.3.10 Of the larger seaweed, the most important are: *ulva lactuca*; *ulva fasciata*; *ulva papenfussi* and *ulva sp.*, commonly called sea lettuce; *grateloupia doryphara*; *chondracanthus chamissoi*; *chondracanthus glomerata* and *porphyrya columbina*, known as "yuyo" and used in cooking.

Fauna

- 2.1.3.11 The diversity of the substratum of the shores allows the presence of micro habitats and thus great biological diversity among the species making up the marine fauna, birds, fish, marine mammals and molluscs. The terrestrial fauna is very scarce, with three species of small lizard (*tropidurus peruvianus*, *tropidurus tigris* and a gecko) and the coastal fox.
- 2.1.3.12 The main species of marine fauna include: *mugli cephalus* (striped mullet); *engraulis ringens* (anchovy); *dasyatis brevis* (stingray); *urotrigon peruvianus* (ray); *paralichthys adspersus* (sole); occasional visitors such as: *delphinus delphinus* (dolphin); small species of whales and sperm whales; *arctocephalus australis* (South American fur seal); *otaria byron* (sea lion); molluscs: *thais chocolata* (winkle); *argopecten purpuratus* (scallop); *octopus fontaineanus* (octopus); crustaceans: *platyxanthus orbigny* (purple crab); and *ocypode gaudichaudi* (crab).
- 2.1.3.13 The bird life consists of the following: condors; guanay cormorants; cormorants; booby; pelicans; flamingo; great egret; snowy egret; blue heron; white-cheeked pintail; turkey vulture; osprey; peregrine falcon; common oystercatcher; black

oystercatcher; snowy plover; black-bellied plover; semi-palmated plover; turnstone; solitary sandpiper; sanderling; semi-palmated sandpiper; western sandpiper; lesser yellowlegs; greater yellowlegs; migrating snipe; whimbrel; skimmer; elegant tern; common tern; Peruvian tern; royal tern; band-tailed gull; kelp gull; grey gull; grey-headed gull; Franklin's gull; Peruvian seaside cinclodes; and grebe.

Seals

- 2.1.3.14 The Paracas National Reserve, as a conservation unit, contains within its shores one of the main concentrations of seals on the entire Peruvian coast. The Reserve has three of the largest stable colonies of South American fur seals, whose population is recovering from the effects of the 97-98 El Niño phenomenon.
- 2.1.3.15 The creation of the Reserve put an end to their indiscriminate slaughter primarily for profit since their skins fetched a good price on the market. In addition to the creation of the Reserve, the Peruvian Government issued Ministerial Resolution No.00103-76-PE of 9 March 1976, pursuant to Decree-Law No.18810, which prohibits seal hunting and it is as a result of this protection that the seal populations have been recovering, as shown by the statistics. In 1976, the total population for all colonies was 2,048 seals, in 1982 the estimated population was 15,821 seals and now these populations have increased so significantly that they are no longer considered to be endangered.
- 2.1.3.16 Seal colonies live on Morro Quemado, Islas Independencia and Santa Rosa, Mendieta, Isla Zárate, Punta Arquillo, Punta Lechuza, Punta Lagarto, Isla San Gallán, Islas Ballestas and Islas Chincha.

Marine Invertebrates

- 2.1.3.17 The area of the Reserve, which includes the Bay of Paracas and Bahía de la Independencia is the leading place on the Peruvian coast for the production and harvesting of shellfish. In recent years, the boom in scallops, *argopecten purpuratus*, as a result of the El Niño phenomenon requires greater attention from researchers into marine ecology, especially the benthic subsystem.
- 2.1.3.18 In 10 places in the Paracas National Reserve and 14 points on the lower beach 8 biotopes can be distinguished: rocky shore; muddy sand; sandy and stony and sandy mud beds; sandy, stony and rocky.
- 2.1.3.19 Benthic invertebrates of 330 types of (excluding nematodes) have been found, 305 of which identified at least to generic level. These types are grouped into 145 families, 43 orders and 15 phyla. Of the total types, 112 are *mollusca* (33.9%), 184 *anelidae* (31.5%), 75 *crustacea* (22.7%) and 39 belong to various other classification groups (11.8%).

- 2.1.3.20 More species were found in hard substrata than in soft substrata: 119 species exclusive to rocky seabeds and 39 on rocky shores; 79 species were found in the remaining 6 biotopes. The numerical results obtained for the main classification groups are still provisional because the samples have not been exhaustive, especially in stony and muddy sand seabeds.
- 2.1.3.21 The total number of molluscs, worms and crustaceans recorded in the Reserve has increased considerably from 103 to 289 species. In the case of crustaceans, species of the orders Ostracoda, Tanaidacea, Cumacea, Isopoda and Amphipoda are being recorded for the first time, the latter being significant, since the 18 species found are 12 amphipods and 6 isopods.

2.1.4 Natural character

- 2.1.4.1 The coast contains two thirds of Peru's total population. Industries of various kinds have been established along the coast and the country's largest towns have grown up there. The Pisco-Paracas area is no exception. However, in its 25 years of existence, the ecosystem of the Paracas National Reserve displays relatively natural conditions compared with other parts of the coast, which reflect the resilience of its natural processes such as maintenance of productive processes, persistence of breeding zones, stability of its colonies, and resistance to drastic change, such as very strong El Niño phenomena, etc.
- 2.1.4.2 It is universally recognized that global populations of migratory shore birds are declining, mainly due to the accelerating destruction of the wetlands which form their habitat. Consequently, international efforts and commitments to protect migratory birds and their habitats, such as the Convention on Wetlands of International Importance (RAMSAR Convention) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention); commitments to which Peru is an official party.
- 2.1.4.3 The situation of wetlands in Peru is no different from that found elsewhere in the world, which is why the Peruvian State is freely and absolutely committed to protecting wetlands and migratory birds.
- 2.1.4.4 Because of its importance and natural character, the Paracas National Reserve has been included in the List of Wetlands of International Importance of the Convention on Wetlands of International Importance (RAMSAR Convention) since 30 March 1992. Protection of the Paracas National Reserve is all the more important because in reality it is not a wetland but a series of wetlands, notably the Bay of Paracas wetland and the estuary of the Río Pisco.
- 2.1.4.5 Thousands of birds migrate annually to the Bay of Paracas to feed and rest. These birds mostly come from Alaska, British Columbia, Alberta and Saskatchewan in Canada. Some of them will stay there throughout the southern summer, feeding and storing energy to return to their breeding grounds. Others will continue their journey to southern Chile and Argentina. For this reason, the Paracas Reserve has also been recognized as a Regional Reserve for Migratory Birds by the Hemispheric Shorebird Reserve Network since 28 September 1991.

- 2.1.4.6 The habitat suitable for thousand of migratory birds arriving in the Bay of Paracas has shrunk to a small area. Migratory birds have characteristics which make them highly vulnerable to anthropogenic environmental changes. Migratory shore birds are extremely faithful to place (homeland tie), meaning that they repeat patterns of migration and stop in the same places year after year. For this reason, the degradation or loss of the wetland features of the shore of the Bay of Paracas and the Río Pisco estuary will lead to the death of these creatures or will force them to move to less suitable places. This displacement will make them spend more energy, with greater risk of falling prey to predators and greater risk to their health.
- 2.1.4.7 The greater expenditure of energy for the birds may mean the possibility that they do not breed or that individuals die. A migratory shore bird is generally a creature of low body weight. The loss of a few grams of fat (energy) is the difference between breeding successfully or not and even between life and death. The main harm to migratory birds caused by the deterioration of the micro-topography of the intertidal zone of the Paracas wetlands is the loss of available food, their only source of energy.
- 2.1.4.8 Although a migratory specimen has a low body weight, the considerable size of the populations of these species (several thousand individuals) means that they require feeding grounds of a size directly proportional to the size of the group. In this sense, the degradation and disappearance of an optimal habitat for migratory birds has a serious impact on the global survival of the species. This characteristic adds to the singular importance of this site, since the Paracas National Reserve is the only place for thousands of kilometres where migratory birds can stop.
- 2.1.4.9 With the disappearance or degradation of their habitat, migratory birds are forced to go in search of alternative feeding grounds. In each place, natural predators on migratory birds follow particular hunting patterns. The prey, in this case the migratory birds, survive this pattern of hunting by natural selection. Thus, when they move, the risk of depredation rises, since they encounter a different pattern of hunting. The population movement means settling in a place with a different hunting pattern, which makes the birds more vulnerable.
- 2.1.4.10 Another effect of the forced population movement is the dispersion of the birds with the consequent decline in the size of the group, which increases the probability of their capture. Groups of migratory birds which have been disturbed are inclined to break up into small groups, which further increases depredation.
- 2.1.4.11 Important colonies of sea birds can be found in the Reserve, mainly in the islands. Apart from guano birds, two species are of particular interest: the Humboldt penguin (*Spheniscus humboldt*) and the Peruvian diving petrel, birds in danger of extinction. In the case of the penguin, one of the three largest colonies on the Peruvian coast is found in Bahía de la Independencia. The case of the diving petrel is even more striking, since the entire population of this species in Peru is confined to the sea area of the Paracas National Reserve.

2.2 Socio-economic and cultural criteria

2.2.1 Economic benefits

2.2.1.1 A series of economic activities are carried on in the Paracas National Reserve, including tourism, as well as various other activities related to the exploitation of hydrobiological resources.

2.2.1.2 The flow of tourists to the Reserve is growing, as shown in the following table:

Visitors to the Paracas National Reserve 1970-1999				
1976-1980	1981-1985	1986-1990	1991-1993	1994-1999
121,323	215,044	266,808	149,253	412,211

2.2.1.3 The tourist facilities in the Reserve consist of the following resources:

- (a) Bay of Paracas, where the liberator, General San Martín landed, which is the natural home for resident and migratory birds.
- (b) El Candelabro, a giant geoglyph 128 metres long and 67 metres wide.
- (c) The Cathedral, a rock formation whose cliffs host a large number of guano birds and some mammals.
- (d) Laguna Grande, a fishing lagoon where most of the small-scale fishing in the Reserve is concentrated.
- (e) Lagunilla, a small fishing lagoon for small-scale fishermen, mainly shellfish.
- (f) Atenas Beach, which contains several archaeological *conchales* or heaps of shells with relics of early fishermen including pottery, weaving and corn in its cultural inventory, dating from 1000 to 800 BC.
- (g) El Sequión Beach, which is a large natural home for birds, where flamingoes, skimmers and boobies can be seen.
- (h) La Mina Beach, which takes its name from the coal mines which used to be there, an area rich in fossils.
- (i) Punta Arquillo, rock formations and cliffs which are home to one of the largest seal colonies in the area and caves where penguins nest.
- (j) Otuma saltpans, where salt is produced.
- (k) Los Frailes, a natural rock formation and refuge for guano birds.

- (l) Yumaque Beach, with sports fishing and camping, and a breeding ground for oystercatchers.
- (m) Mendieta Beach, for sport fishing and diving; an ideal beach for bathers and camping.
- (n) Chuncho Beach, suitable for sport fishing and camping. There are some 20 dwelling mounds from the Paracas Cave era (500-200 BC). It is the largest archaeological site of the Paracas coast.
- (o) Carhuaz Beach, ideal for sport fishing, swimming and camping. There are traces of human populations, *conchales* and cemeteries from the Paracas-Chavin era (600 BC) up to colonial times.
- (p) Julio C Tello Site Museum and Paracas National Reserve Interpretation Centre. It has exhibitions of artefacts of the ancient peoples of the area.
- (q) Chain of 9 islands which are the prime habitat for the largest population of guano birds and seals in the Reserves.
- (r) Leisure beaches, places for sports activities such as swimming, sailing, fishing, camping, photography, etc.
- (s) Natural beauty; resident and migratory birds can be observed and seals can be seen on the cliffs.
- (t) Archaeology; there are numerous remains of the civilizations that inhabited ancient Peru in this part of the country.

2.2.2 Leisure

- 2.2.2.1 Various sports and leisure activities take place throughout the year in the area of the Reserve. In the Bay of Paracas the main activities are sailing competitions, wind-surfing, water-ski and other sports.
- 2.2.2.2 In summer, its beautiful beaches are filled with holidaymakers from Pisco and nearby towns, concentrating in the El Chaco area in the Bay and the beaches of La Mina and Lagunillas.

2.2.3 Human economy

- 2.2.3.1 Most of the human population and the local economy in this part of the coast are basically engaged in harvesting and processing hydrobiological species and tourist-related activities.

2.2.3.2 However, apart from the resident population that exploits those resources, there is a migrant population coming from any of the ports or coves along the coast of Peru. These migrants are hug during the ENSO, mainly attracted by the scarcity of their own marine species during "normal" periods in different latitudes and the expectations created by the population explosion of scallops, a resources which supports a huge market and which involves a large number of people.

2.3 Scientific and educational criteria

2.3.1 Research

2.3.1.1 Scientific and technological, fisheries and marine research programmes are conducted in the Reserve by specialized public institutions such as the Peruvian Marine Institute (*Instituto del Mar del Perú*), the Hydrographic and Navigation Department of the Peruvian Navy, universities and natural and legal persons in the private sector.

2.3.1.2 Research activities in the Reserve include creating an inventory of its flora and fauna, comprising identification, numbers and distribution; studies of fish-farming in the environment and studies of natural stocks; periodic population censuses; biology and management of turtles and behaviour and distribution of smaller cetaceans, as well as migratory and resident birds; studies of algae, sea cucumbers, flying fish and others; constant monitoring of ecosystems and species of commercial importance, and potential threats.

2.3.2 Basic studies and surveillance

2.3.2.1 Studies are in progress to complete the demarcation of the Reserve for the purposes of protection, by installing boundary posts and to solve problems of private activity and services.

2.3.2.2 Various alternatives for managing the resources of the marine and coastal areas in a rational way are constantly being evaluated, by planning activities so as to ensure their sustainability, while improving profitability.

2.3.2.3 After preliminary studies, areas for communal ecodevelopment are selected within the Reserve and its area of influence to allow economic, social and ecological activities.

2.3.2.4 Periodic land and sea patrols are carried out within the Reserve for surveillance and control to safeguard its natural beauty and the natural and cultural resources of this national protected area.

2.3.3 Educational and historical value

2.3.3.1 Comprehensive education and information programmes are provided for students, the general public and all economic agents operating in the Paracas National Reserve, aimed at its conservation, preservation and sustainable development.

2.3.3.2 In the Paracas region, both continental and shore, there are some 104 archaeological sites, most of them within the Reserve, covering every period of prehispanic Andean societies.

- 2.3.3.3 This enormous potential has attracted the attention of many people from the remote past. The present area of the Reserve served for the settlement of prehispanic peoples.
- 2.3.3.4 The Reserve includes within its boundaries the Paracas National Prehistoric Park, designated by Supreme Decree No.15 of 21 June 1960.

2.4 National and international importance

- 2.4.1 Because of its importance and natural character, the Paracas National Reserve has been included in the List of Wetlands of International Importance of the Convention on Wetlands of International Importance (RAMSAR Convention) since 30 March 1992.
- 2.4.2 The Paracas National Reserve has also been recognized as a Regional Reserve for Migratory Birds by the Hemispheric Shorebird Reserve Network since 28 September 1991.
- 2.4.3 A proposal is being prepared for submission to UNESCO to have the Paracas National Reserve declared a Biospheric Reserve.
- 2.4.4 At national level, it is included in the system of protected natural areas, being considered as a National Reserve by the Peruvian Government in Supreme Decree No.1281-75-AG of 25 September 1975.
- 2.4.5 By a resolution of the Ministry of Tourism of Peru of 5 September 1996, San Gallán island and the Ballestas islands were incorporated in the Reserve, in addition to two miles of the surrounding sea area measured from the coastline.
- 2.4.6 In addition, by Ministerial Resolution No. 1082-90-AG 1990, it was considered that the Paracas National Reserve is host to various species of fauna classified as endangered, among them:
- (a) the marine otter (*lutra felina*)
 - (b) the Humboldt penguin (*spheniscus humboldti*)
 - (c) the Chilean flamingo (*phoenicopterus chilensis*)

3 VULNERABILITY OF THE PARACAS NATIONAL RESERVE TO DAMAGE BY INTERNATIONAL MARITIME ACTIVITIES

3.1 International maritime activities in the area

- 3.1.1 The principal activities are the passage of merchant ships in the vicinity of the Reserve and the arrival, stay and departure of tankers at Puerto General San Martín and at the offshore multi-buoy terminal for loading and unloading of pollutants including hydrocarbons and sulphuric acid, among others.

3.1.2 The movement of ships in the port is shown below:

YEAR	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
No. of ships	84	86	66	114	125	133	98	151	104	186

- 3.1.3 An average of 395 to 535 merchant ships a month pass in the vicinity of the Reserve or through it.
- 3.1.4 The meteorological conditions are basically subtropical because of the effect of the coastal upwelling and the South Pacific anticyclone which gives it an arid climate with high temperatures. The average air temperature ranges from 16.2°C to 22.7°C with the highest temperatures recorded in February. The maximum ranges from 20.2°C to 27.7°C.
- 3.1.5 The relative humidity ranges from 82 to 84 per cent. The average total annual precipitation is 0.09 mm/m² in summer and 0.60mm/m² in winter.
- 3.1.6 One of the dominant characteristics of the desert climate of the Peruvian coast is the constant presence of wind. The winds are persistent, highly constant in direction and with a marked daily cycle caused by the heating of the coastal desert. The hourly pattern of variations is calm during the morning, strengthening from midday. Then comes a period of calm in the evening, followed by greater strengthening in the early hours of the night, with gusts up to 15 to 17 m/sec.
- 3.1.7 Due to the thermal balance between the ocean and the continent which occurs in the early hours of the morning, the winds are light, between 1 and 6 knots, inclined to calm, increasing gradually in the evening to reach speeds of 16 to 20 knots (roughly between 1800 and 2100 local time) and absolute maximum speeds of up to 30 knots.
- 3.1.8 There are no wave measurements available for the area of the Reserve, but visual observations have been made at various times of year. Shown below is a table of average directions and height of waves for the region between 10° and 15° South (information from Sailing for South America). The table is very general but it does allow an appreciation of the range of wave heights and the approximate predominant direction. This information was obtained from 6,907 observations and refers to Swell waves which are waves which originate in the open sea and travel large distances. This type of wave is the main source of the height of waves whose impact determines the dynamics of the coast of the Reserve.

**DISTRIBUTION OF SWELL WAVES
 (10°-15° SOUTH)**

Height metres	W	SW	S	SE	E
	%	%	%	%	%
0.3-1.8	0.7	9.7	35.4	8.2	-
1.8-3.6	0.3	6.7	25.2	6.3	0.4
+3.6	-	1.0	2.3	0.5	0.3
Total	1.0	17.4	62.9	15.0	0.7

According to this information, the predominant directions of waves are south and south-west, while the other directions are less frequent.

3.1.9 The system of currents off the coast of Peru runs in a northerly direction.

3.1.10 There have not been any accidents to date involving shipping, such as grounding, collisions or spills. However, it can be assumed that an operational or accidental spill could occur at any time, in addition to discharge into the sea of garbage and foul water from unidentified ships.

3.2 Potential harm

3.2.1 The Paracas National Reserve is a highly sensitive ecosystem with limited capacity to absorb adverse environmental effects.

3.2.2 The Reserve is highly vulnerable due to the risk presented by the transport and transshipment of oil, sulphuric acid and other noxious substances harmful to the environment, resulting from the operation of tankers. The quantities used and handled make this a major source of environmental risk, above all because of the possibility of spills, toxicity and flammability.

3.2.3 With the privatization of state enterprises, including the ports, it is estimated that movements of these products will increase, as the economy of the country and the region grows.

3.2.4 The pumping of bilge water, discharge of sewage and waste from ships are also activities which put at risk the ecological health of the Reserve.

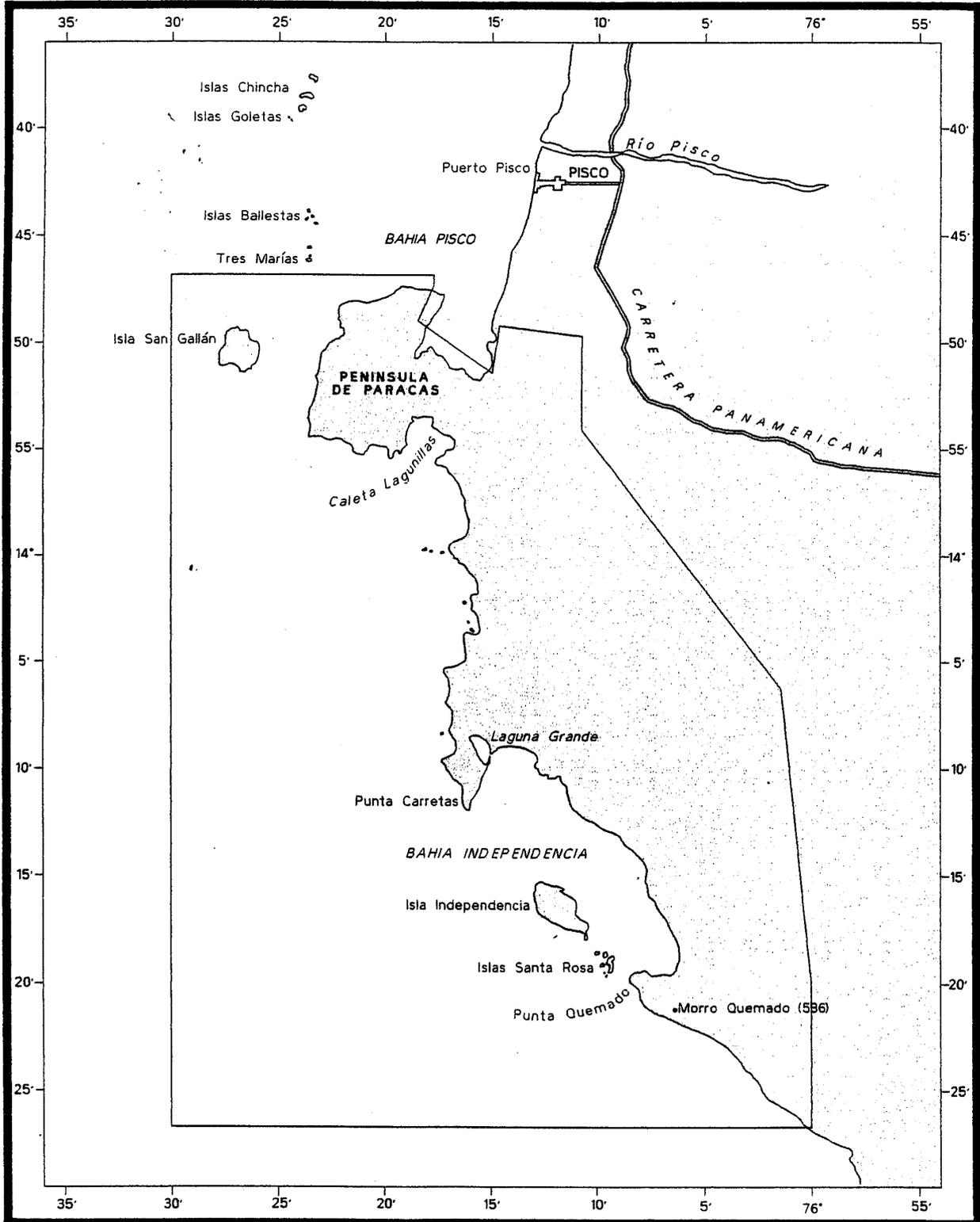
3.2.5 The increase in shipping in the vicinity of the Reserve adds to the chance of accidents such as collisions, grounding or other accidents which could seriously endanger the present biodiversity in the Reserve and affect its natural wealth, such as beaches and tourist areas, with an economic impact on the people of the area engaged in harvesting hydrobiological products, tourism and leisure.

PART II - APPROPRIATE PROTECTION MEASURES AND IMO'S POWER TO ADOPT SUCH MEASURES

- 4 The International Maritime Organization is requested to consider the sea area of the Paracas National Reserve as a "particularly sensitive sea area", so that all ships engaged in international navigation adopt appropriate measures to avoid actions which might harm the ecological health of the Reserve.
- 5 The first measure required is prohibition of navigation of tankers within the sea area of the Paracas National Reserve, as duly defined in shipping charts - PERU HIDRONAV-2710, "Coast of Peru: Pisco-Paracas-Bahía Independencia.
- 6 Another measure is to prohibit any kind of discharge from ships within the sea area of the Reserve, including discharge of sewage and waste.
- 7 The above-mentioned measures will contribute to ensuring adequate protection for the largest area of marine biodiversity in Peru, encouraging migratory species from places as far away as Alaska, Canada and Antarctica.
- 8 The prohibition of tanker navigation within the sea area of the Reserve, apart from those entering and leaving the port, will not cause harm or financial loss to their owners since they do not need to pass through the Reserve en route to other ports, thus they will not waste any time in avoiding the area.
- 9 Finally, to summarize, the Peruvian Government has so far taken the following steps to protect the Paracas National Reserve:
 - 9.1 It has been included in the List of Wetlands of International Importance of the Convention on Wetlands of International Importance (RAMSAR Convention) since 30 March 1992.
 - 9.2 Its has also achieved recognition as a Regional Reserve for Migratory Birds by the Hemispheric Shorebird Reserve Network since 28 September 1991.
 - 9.3 A proposal is being prepared for submission to UNESCO to have the Paracas National Reserve declared a Biospheric Reserve.
 - 9.4 At national level, it is included in the system of protected natural areas, being declared a National Reserve by the Peruvian Government in Supreme Decree No.1281-75-AG of 25 September 1975.
 - 9.5 By a resolution of the Ministry of Tourism of Peru of 5 September 1996, San Gallán island and the Ballestas islands were incorporated in the Reserve, in addition to two miles of the surrounding sea area measured from the coastline.
 - 9.6 In order to protect the Paracas National Reserve, the Peruvian Maritime Authority issued a national regulation in Departmental Resolution No.0103-96-DCG of 17 April 1996, which prohibited the passage of ships carrying cargoes of hydrocarbons and other polluting substances in the Paracas National Reserve sea area.

- 9.7 At the request of the Peruvian Maritime Authority, at its seventy-second session in May this year, the Maritime Safety Committee approved Peru's proposal, as a special protection measure, to establish four maritime traffic separation schemes for four ports, including Puerto de Pisco which is located in an area adjacent to the Paracas National Reserve.

PARACAS NATIONAL RESERVE
RESTRICTED AREA



LOCATION SKETCH MAP OF THE PERUVIAN COAST
PARACAS NATIONAL RESERVE

