

# **ECOREGIONAL ASSESSMENT EQUATORIAL PACIFIC: MARINE COMPONENT**

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## **EXECUTIVE SUMMARY**

The main objective of this evaluation is to identify priority conservation sites within the marine ecosystems of the Equatorial Pacific region. A portfolio of coastal and marine sites was identified, including information available for decision makers and stake-holders for marine natural resources in Ecuador and Peru.

The methodology, developed by The Nature Conservancy and successfully applied in other regions, was used as the main basis for the development of the study. Ecoregional assessments are the first step in The Nature Conservancy's framework for mission success – Conservation by Design – in that they set the biodiversity priorities for which strategies are developed, action is taken and success is measured in every ecoregion in the world where the Conservancy and its partners work.

The main executing organization of the study was the SIMBIOE-Nazca alliance. Activities were done with collaboration of Governmental Organizations museums, herbariums, universities and NGOs, both in Ecuador and Peru.

The results show there are at least 18 marine-costal priority areas to be protected in order to sustain unique species in means of commercial, cultural and biological importance. These areas add about 500.000 hectares in all that is 15% of the marine-costal border studied in both countries.

This study is one of the first ecoregional evaluations developed for marine ecosystems, not only in the Equatorial Pacific region, but also in Latin America. In fact, most of the previous studies for the Guayaquil marine ecoregion are related to fisheries, meteorological conditions, water chemistry and others issues of the El Niño phenomena and the commercial navigation.

This ecoregional evaluation not only includes physical and chemical data, but also biological composition and ecology of the flora and fauna populations living on coasts (sandy or rocky coasts), open

waters (pelagic communities) or ocean deepness (benthonic communities). The scientific team has discovered new biological records for South America, such as some star-fish and other species that were considered endemic to the Galapagos and some other species that were considered only from Central American coasts.

The Guayaquil marine ecoregion contains more than 3'200,000 hectares of open water and continues along the coast for more than 1,000 Km., from the equator (Pedernales in Manabi Province, Ecuador) to latitude 6 south at the Illescas Peninsula in northern Peru. The huge area of the ecorregion and the challenges of underwater scientific research make that this ecoregion keeps several secrets waiting to be revealed.

The "up-welling" phenomena generated by the Humboldt's current brings millions of tons of nutrients from the sea bottom to the surface, making the Guayaquil marine ecoregion one of the biologically richest in the world, similar to other marine areas where this phenomena occurs. This phenomena provides abundant food for a large array of coastal and marine fauna and other associated species, such as fishing birds and mammals, including sea-wolfs.

Given the biological and ecological conditions of this marine ecoregion, undertake conservation and marine resources management should be a logical activity to develop, but unfortunately very few conservation actions has been implemented in the region.

Moreover, uncontrolled marine related industry development, such as large-scale fisheries, shrimp industry and other pollution generating industries -including increasing massive tourism- put at risk the ecological and biological balance of the ecoregion. These activities are developed in such a way that decreases production for the same industries.

With the main purpose of providing the necessary elements for the coastal-marine Equatorial Pacific conservation, The Nature Conservancy and local partners developed this study, with the participation of national organizations, community-based organizations, and different social, economic and scientific sectors from Ecuador and Peru.

The Ecoregional Evaluation Methodology was applied, including 4 main steps:

(1) Selection of conservation objects. These are species, group of interacting species or ecological systems presenting an outstanding importance for the ecoregion. Selection is based on the main threats, rarity, endemism and/or the human importance of the objects (useful

species, flag-species, others). Geographical distribution of the objects is represented on maps, using Geographic Information Systems.

(2) Viability evaluation. This step evaluates the object's capacity of maintaining their populations or their ecological functionality over the time. The main species or ecosystems' threats are analyzed ("condition" criteria), as well as the population density and/or the area occupied by the conservation objects ("size" criteria). Also the "landscape context" of the objects is evaluated, which is a criteria integrating several aspects, such as "connectivity" within populations and the "integrity" of the main surrounding ecological processes. Among other techniques, advanced Geographic Information Systems and mathematical applications are used for the viability evaluation.

(3) Definition of conservation goals. This part of the study defines what are the minimal proportions or size aspects of a population or ecological system in order to survive in the future. By this means are identified the minimal areas to be protected for a population or an ecosystem to be viable.

(4) Portfolio design. The main purpose of the portfolio of sites is to ensure that most or all viable conservation objects are properly represented within one or more sites of the network. This portfolio is scientifically supported by the previous steps and results, and is also represented in maps for an easy interpretation by conservation decision makers.

The study identified 18 coastal-marine high priority block-sites within the ecoregion, adding a surface of more than 500,000 hectares. Also, these blocks represent up to 63 % of the total expected portfolio and contain close to 15 % of the whole ecoregion.

These marine block sites are proportionately distributed among 3 main ecoregional zones: the Tropical zone (north), the Central zone (or intermediate band) and the Subtropical zone in the south. The selected 18 sites represent most of the inter-tidal and sub-tidal priority areas. Also, 6 of the 8 priority biological communities are represented, as well as the majority of the species identified as important conservation objects.

Curiously enough there are only 4 protected areas along the marine ecoregion: Machalilla National Park, Manglares-Churute Ecological Reserve, Santa Clara Wildlife Sanctuary (these 3 areas in Ecuador) and Manglares de Tumbes National Sanctuary in northern Peru. Even though these areas contain important coastal-marine elements, effective protection of marine resources are still to be seen.

Threats and impacts (mentioned above) are not completely controlled, even inside protected areas. The total surface of these protected areas is largely insufficient in front of the protection requirements of coastal, pelagic and benthonic organisms. Also, 3 of these protected areas are focused on mangrove conservation, which is already a big challenge in front of shrimp-farm expansion and the increasing demands for firewood, bivalves and blue crabs for food.

Finally, besides the scientific data obtained, this ecoregional evaluation provides an array of general recommendations regarding management and conservation of marine resources. These results are available for coastal authorities both in Ecuador and Peru, as well as for local authorities, fisheries, coastal communities, industry (shrimp, other polluting industries), scientists, tourism guides and tourism operators. Only a joint effort within these sectors can provide hope for the conservation of our valuable marine resources.