

## Location



## Introduction

The Republic of Ecuador is located in northwestern South America, bordered on the north by Colombia, on the south and east by Peru and on the west by the Pacific Ocean. The country also includes the Galapagos Islands/ Las Islas Galapagos, officially known as the Archipelago de Colon, 926 km offshore to the west.

The coastal climate varies from tropical to temperate with dry weather during the winter months and a rainy season from May to September during which large volumes of freshwater and suspended solids from inland are washed into the ocean. The country's approximately 2,237 km of coastline is characterised by high levels of biodiversity and numerous endemic species.

Ecuador saw some protests by indigenous peoples in 2019, over the repeal of fuel subsidies, which resulted in impacts to oil field production and clashes with the police. There have been no further problems since the fuel subsidies were restored that same year. The cocaine trade from Colombia and Peru passes through Ecuadorian waters and there is some increase in drug trafficking groups and Colombian insurgents crossing the northern border.

## Regional Seas and Biogeography

South-East Pacific Ocean

Large Marine Ecosystems:

- Pacific Central-American Coastal
- Humboldt Current

## Habitats

Ecuador boasts great geographic diversity, both on the mainland and on the Galapagos Archipelago, including estuaries, beaches, bluffs, islands, and rocky and sandy beaches. The Humboldt Current LME has the largest upwelling system in the world, supporting one of the world's most productive fishing grounds, areas that also serve as a source of food for marine wildlife. The region is vulnerable to the El Niño Southern Oscillation phenomenon which can have significant impacts on that productivity.

-> **Tidal Flats/Wetlands:** There are extensive tidal flats and wetlands, both on the mainland and on the Galapagos Archipelago and these provide important habitat for resident and migratory seabirds.

-> **Rocky Shores:** There are areas of rocky coast both on the mainland and in the Galapagos Archipelago, those with limited access provide safe haven for marine wildlife.

-> **Mangroves:** The majority of the country's mangroves are found within six estuaries: *Cayapas Mataje, Muisne, Cojimies, Chone, Golfo de Guayquil* and *Jambeli Archipelago*.

-> **Corals:** Cold water corals are found on both the mainland and in the Galapagos Archipelago.

-> **Saltwater marshes:** The few saltwater marshes found in Ecuador are widely scattered, with at least one area in the Galapagos.

## Biodiversity Hotspots

In this section, acronyms are used for some of the most common types of hotspots: Marine Reserve (MR), National Park (NP), Ramsar Wetland of International Importance (Ramsar), Important Bird Area (IBA)

-> **Ramsar sites and National Parks**

*Galapagos NP* (also a UNESCO World Heritage site, which includes the *Galapagos Marine Reserve* and a second reserve under consideration and several IBAs) hosts numerous endemic species including several waterbird species, sea lions, fur seals and marine iguanas in a biologically unique region. Within the *Galapagos*

*NP, the Humdeales del Sur de Isabela* (a secondary Ramsar site) encompasses coastal and marine environments with many endemic and IUCN listed species.

*Reserva Ecologica de Mangalares Cayapas-Mataje* (also an Ecological Reserve and IBA) on the north coast consists of estuarine habitats and mangrove forests within the Choco-Darien Western Ecuador hotspot, a region recognised for its high level of biodiversity, and hosts more than 50 species of mammal, at least 145 avian species, and more than 20 reptile species. Neotropical otter, jaguar, blue-fronted parrot and American crocodiles are known to be present here.

*Zona Marina Parque Nacional Machalilla* (also a MR and IBA) consists of shallow coastal waters, sandy beaches and offshore islands fringed by coral reefs where breeding seabirds and nesting sea turtles are found. Marine mammals forage offshore.

*Mangalares de Estuario Interior del Golfo de Guayaquil "Don Goyo"* (also an IBA), *Isla Santay* and *Mangalares Churute* (also an Ecological reserve and IBA), all within the *Golfo de Guayaquil* (the biggest estuary of Ecuador), provide habitats for a variety of birds, mammals and reptiles. The two mangalares (or mangroves), one on each side of the Gulf, host endemic species and assist with control and prevention of flooding. *Isla Santay* includes the island and surrounding waters which provide habitat for a number of threatened species.

*Refugio de Vida Silvestre Isla Santa Clara* (also a Protected Area of Natural Heritage and an IBA) is a small island with rocky shores at the mouth of the *Golfo de Guayaquil* forms a complex transitional marine/coastal system and is a major refuge for biodiversity on the mainland coast hosting large numbers of marine and shorebirds.

#### -> **Marine Reserves**

*Galera San Francisco Reserva Marina*, the first marine reserve declared by Ecuador, is located in southwestern Esmeraldas province and includes marine, coastal and estuarine habitats. These host four species of marine turtle and a variety of cetaceans including breeding/calving humpback whales.

*Reserva de Produccion de Fauna Marino Costera Puntilla de Santa Elena* is another important nesting area for sea turtles.

*Refugio de Vida Silvestre Mangalares Estuario Rio Muisne* provides resting, feed and breeding areas for sea turtles, birds and mammals.

#### -> **IBAs**

*Tonchigue-Mompiche* hosts more than 200 avian species, 67 mammal species and numerous reptiles. A number of the birds reported are endemic and/or IUCN listed.

*Pacific, Southeast 24-Marine* hosts thousands of critically endangered breeding/nesting waved albatross from March through July. This IBA is part of a continuous corridor of IBAs from the Peruvian coastline to the Galapagos archipelago.

*El Archipelago Jambeli*, located just south of Guayaquil on the coast, is dominated by mangroves, mudflats and estuaries. Approximately 75 species of bird, including 42 aquatic or coastal species are found here, and dolphins are recorded offshore.

*La Reserva Ecologica Arenillas* in southwest Ecuador includes mangroves and inland habitats where more than 150 species of bird have been recorded, with the mangroves being an important congregation area for resident and migratory shorebirds.

## **At risk Wildlife**

In this section, some individual wildlife species are mentioned followed by a letter in parentheses. These are species included in the IUCN Red List of Threatened Species within the top three categories of risk - Vulnerable to extinction (VU), Endangered (EN) or Critically Endangered (CR). A more complete list of IUCN listed species is found in Appendix 1.

### ➔ **At risk birds**

Ecuador hosts a large number of waterbird species, many of which are resident. Along the coast ducks, waders and shorebirds regularly forage. Nearshore and offshore gulls, jaegers, albatross and frigatebirds are common. Some vultures and hawks may forage along the coast.

**→ At risk reptiles**

Five species of sea turtle—Green, Loggerhead, Olive ridley, Leatherback, and Hawksbill, the marine iguana (Galapagos only), and several sea snakes inhabit Ecuadorean waters.

Of the sea turtles, greens are the most common and, along with the Olive ridley, nest regularly, mostly on northern beaches. The Hawksbill has several important nesting sites on the Galapagos and also nests on the north coast of the mainland.

Only five Leatherback nests have been recorded on Ecuadorean beaches, however the species is regularly found foraging in the area. Loggerhead nesting has not been recorded, although the species forages on the coast regularly.

**→ At risk mammals**

More than 33 species of marine mammal have been recorded in Ecuadorean marine waters and the Amazon River, many of them offshore species. Some dolphins may spend time nearshore and fur seals and sea lions spend time on land in the Galapagos. The South Eastern Pacific population of humpback whale breeds and calves from June to October, particularly along the Manabi and Esmeraldas provinces.

Neotropical otters may be found foraging along the coast.

**Past experience with oil spill and potential risks**

Various spills have occurred in Ecuador including the *St Peter* (1976) which occurred on the Colombia/Ecuador coast; on the Galapagos, the *MV Iguana* (1988) ran aground releasing 20 tonnes of diesel fuel, and another spill of approximately 20 tonnes occurred off *Puerto Villamil* (2002), also in the Galapagos. In none of these spills were there reports of wildlife impact.

In 2001, the tanker *MV Jessica* ran aground on the *Schiavoni Reef* off of *San Cristobal Island*. 600 tonnes of diesel and bunker oil were spilled. The Ecuadorean Navy and the US Coast Guard responded. Oiled wildlife was rescued by Galapagos National Park Service (GNPS) staff and the Charles Darwin Foundation (CDF). Two international teams were invited by national authorities to aid in the wildlife response. Sea Alarm sent specialists from the Seal Rehabilitation Centre (Netherlands), Emmen Zoo (Netherlands) and the RSPCA (UK) to work with marine mammals and the IFAW International Oiled Wildlife Team worked on bird rescue and rehabilitation. 370 impacted animals were recorded by the Charles Darwin Research Station, 117 avians including lava gulls, Galapagos penguins, flightless cormorants, and pelicans. 79 Galapagos sea lions and 145 marine iguanas were also rescued and treated. Longer term impacts to sea lion and marine iguana populations were noted during the impact assessment performed by the CDF.

There have been a number of inland spills from the Trans-Ecuadorean pipeline, in the Amazon, most recently in 2020.

Ecuador is the fifth-largest producer of oil in South America. Ecuador's most productive oil fields are located in the northeast corner of the country. The largest oil field is Shushufindi. Other major oil fields include Sacha, Dorine and Eden Yuturi. Ecuador has two major oil pipeline systems: the Trans-Ecuadorian pipeline (SOTE) and the Pipeline of Heavy Crude (OCP). The completion of the OCP pipeline in 2003 led to a sharp increase in Ecuador's crude oil production. Ecuador also utilises one international pipeline, the TransAndino, which connects Ecuador's oil fields with the Colombian port of Tumaco.

The Trans-Ecuadorean pipeline is, at present, the highest risk factor for spills in the country, although Ecuador is also situated along a major shipping route to and from the Panama Canal.

Generally, oil and gas blocks overlap areas of peak biodiversity and protected areas.

**International and Regional Treaties and Agreements****→ Oil spill and HNS Response**

- CLC Convention 69
- CLC Protocol 76
- CLC Protocol 92
- FUND Protocol 76
- FUND Protocol 92
- FUND Protocol 2003
- LLMC Convention 76
- LLMC Protocol 96
- OPRC Convention 90

- HNS Convention 96
- HNS PROT 2010
- OPRC\_HNS 2000
- BUNKERS CONVENTION 01

## → Marine Biodiversity Protection

- Lima Convention and its Agreement on Regional Cooperation to Combat Pollution of the Southeast Pacific by Hydrocarbons and other Harmful Substances in Cases of Emergency

And its Complementary Protocol to the Agreement on Regional Cooperation to Combat Pollution of the Southeast Pacific by Hydrocarbons and other Harmful Substances

- Operative Network for Regional Cooperation among Authorities of South America, Mexico, Panama and Cuba (ROGRAM)

## Oil Spill Response and HNS Spill Response

### → National Contingency Plan?

The Ecuador Coast Guard (ECG) developed an organisational plan which clarifies responsibilities between themselves, the Direccion General de la Marina Mercante y del Littoral (DIGMER/ Marine and Coastal Directorate of the Ecuadorean Navy) and the national oil company Petroeucador.

All port authorities, oil companies and terminal operators are expected to operate local contingency plans. There are also four regional plans: two for the mainland coast, one for the Amazon (covering pipeline spills) and one for the Galapagos.

### → Role of Competent National Authorities

DIGMER is responsible for preventing and controlling spills in Ecuador. Within DIGMER the Pollution Control Office is responsible for coordination of clean-up of spills nationally.

The Ministerio del Ambiente y Agua del Ecuador; (MAE or the Ministry of the Environment and Water) coordinates mitigation and clean-up on the mainland. The GNPS, on behalf of the Ministry, is responsible for clean-up and remediation, as well as coordinating wildlife response operations within the Galapagos.

## Oiled Wildlife Preparedness and Response

### → Formal guidelines?

There is no formal policy, nor are there official guidelines for oiled wildlife response, however there are contingency and prevention plans for oil spills in the Galapagos which address wildlife issues at a basic level.

### → Response objectives and strategy

Based on the response to the MV Jessica spill in 2001, it is expected that the MAE del Ecuador would establish an emergency coordination mechanism which would include scientific and technical issues, communications and information, logistics support and coordination of international assistance. Priorities would be focused on minimising the impacts of the of the spill.

### → Euthanasia or rehabilitation?

The authorities will allow the rehabilitation of oiled animals, however oiled wildlife response in the Amazon would be a challenge due to the remoteness of the region.

In the Galapagos, the CDF will assist the GNPS particularly on clean-up operations and wildlife rescue and rehabilitation activities.

During the Jessica spill in the Galapagos, two oiled wildlife rescue and rehabilitation protocols were developed. A general protocol, developed by the overall wildlife coordination team, consisted of an operational strategy and guidelines for internal and external communication. A second protocol on sea lion capture and rehabilitation was first drafted by local experts, then an extension on medication and euthanasia developed by international experts and the coordinating team was added.

This latter protocol contained the criteria for the selection of oiled animals whose recovery would require capture

and rehabilitation. This amended protocol was approved.

## → Impact assessment

The GNPS and the CDF have a list of Priority species, based on their conservation status and the degree of impact they are likely to suffer from oil spills. CDF conducted an evaluation study of the spill's impact in the aftermath of the Jessica spill.

### Birds:

Aves y Conservacion (Bird & Conservation), the Ecuadorean Birdlife International partner would likely be involved in avian impact assessment, as they have tracked oiled birds in *Peninsula St. Elena* and manage a national database on birds.

### Sea Turtles

The WildAid Marine Program, in cooperation with the MAE and with technical assistance and funding from Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ or German Society for International Cooperation), has had a sea turtle monitoring project since 2019 and would likely be involved in impact assessment of these species. Fundacion Contamos Contigo Ecuador was also involved in this project, conducts nest monitoring on the mainland and may help with turtle impact assessment. WildAid has also conducted open ocean monitoring in the Galapagos, thus would be of help in monitoring offshore species. The NGO Equilibrio Azul works with the MAE and has expertise in sea turtle monitoring.

### Marine Mammals

The Darwin Network (or Friends of Galapagos Organisations (FOGOs)) includes several international organisations that support work in the Galapagos and may be able to assist during an incident there. The Fundacion Ecuatoriana para el Estudio de Mamiferos Marinos (FEMM or the Ecuadorian Foundation for the Study of Marine mammals) and the University San Francisco de Quito have worked together on marine mammal research and would likely be involved in marine mammal impact assessment. The Pacific Whale Foundation has conducted surveys of whales in *Machilla National Park*, thus may be able to assist with surveys there. The Nazca Institute for Marine Research has also been studying the population biology, behaviour and conservation issues regarding the marine mammals of Ecuador. WWF Ecuador has several marine projects and may also be able to assist.

## → Notification and early response

In the Galapagos the MAE would notify the GNPS, which would notify the CDF. It is likely that similar arrangements would occur in other protected areas of the coast.

## → Wildlife responders

There are no specialised wildlife rescue centres for oiled wildlife in Ecuador. There are some rehabilitation facilities on the mainland, however they are largely concentrated in the Amazon so would only be likely to potentially assist with pipeline spill incidents. The Santa Martha Rescue Center is based in the Andes but works closely with the Ministry of Environment and Environmental Police so may be of help in working with government agencies. Merazonia Animal Rescue Centre in the Pastaza province also rescues Amazonian animals, mainly birds and monkeys, however, they have no experience with marine species or oiled wildlife. In most cases international assistance would be required.

## → Cooperation between stakeholders

Many of the organisations and agencies listed above have cooperated on projects. The CDF works closely with the GNPS.

## → Permanent facilities

The few permanent facilities in the country are largely on the mainland, work with terrestrial species, and have limited resources.

## → Current processes

No reference

## Documentation and references

- ITOPF Country profile (2007): <https://www.itopf.org/knowledge-resources/countries-territories-regions/ecuador/>



- IMO (2021): <https://www.imo.org/en/About/Conventions/Pages/StatusOfConventions.aspx>
- Sea Alarm Country Wildlife Response Profile (2010): <https://www.sea-alarm.org/publications/country-wildlife-response-profiles/>
- Large Marine Ecosystems Hub: Pacific Central-American Coastal LME: <https://www.lmehub.net/#pacific-central-american-coastal>
- Ramsar Country Profile: <https://www.ramsar.org/wetland/ecuador>
- Birdlife Datazone Profile: <http://datazone.birdlife.org/country/ecuador>
- UNEP WCMC – Ocean Data Viewer: <https://data.unep-wcmc.org/datasets/>
- Permanent Commission of the South Pacific (CPPS): <http://www.cpps-int.org/index.php>
- Coastal Scenic Evaluation of Continental Ecuador and Galapagos Islands: Human Impacts and Management Issues: <https://www.mdpi.com/2077-1312/8/6/468/pdf>
- [Marine Mammal Distribution in Ecuador: surveys aboard a ship of opportunity as a means of monitoring relative abundance 2015: https://www.lajamjournal.org/index.php/lajam/article/view/441/pdf](https://www.lajamjournal.org/index.php/lajam/article/view/441/pdf)
- Ministry of the Environment Protected Areas (Ministerio del Ambiente Areas Protegidas): <http://areasprotegidas.ambiente.gob.ec/en>
- El Senso Neotropical de Aves Acuaticas 2004 I (Census of Aquatic Birds in South America): [http://www.eco-index.org/search/pdfs/754report\\_1.pdf](http://www.eco-index.org/search/pdfs/754report_1.pdf)
- Mangrove in Ecuador: Conservation and Management Strategies (2021): <https://www.intechopen.com/books/coastal-environments/mangrove-in-ecuador-conservation-and-management-strategies>

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## **Appendix 1**

### **→ At risk birds**

**Common name / Latin name / IUCN Red List Category (CR,EN,VU) / Resident-Migratory (season) / Breeding-Nesting-Pupping (season)**

Waved albatross / *Phoebastria irrorate* / CR / Resident / Breeding/nesting (March-July)

Galapagos petrel / *Pterodroma phaeopygia* / CR / Resident / Breeding/nesting (breeds and nests inland)

Mangrove finch / *Geospiza heliobates* / CR / Resident / Breeding/nesting (December-May in mangroves)

Galapagos penguin / *Spensicus mendiculus* / EN / Resident / Breeding/Nesting (Breeds and nests inland)

Peruvian tern / *Sternula lorata* / EN / Migratory / Non-breeding (March-September)

Galapagos rail / *Laterallus spilonota* / VU / Resident / Breeding/Nesting

Leach's storm-petrel / *Hydrobates leucorhous* / VU / Resident / Breeding/Nesting

White-chinned petrel / *Procellaria aequinoctialis* / VU / Resident / Breeding/nesting (October-March)

Black petrel / *Procellaria parkinsoni* / VU / Resident / Breeding/nesting (November-May)

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Pink-footed shearwater / *Ardenna creatopus* / VU / Resident / Breeding/Nesting (October-May)  
Flightless cormorant / *Nannopterum harrisi* / VU / Resident / Breeding/nesting (mainly July-October)  
Lava gull / *Larus fuliginosus* V / VU / Resident / Breeding/nesting  
Southern royal albatross / *Diomedea epomophora* / VU / Migratory / Breeding/nesting (October-February)

➔ **At risk reptiles**

**Common name / Latin name / IUCN Red List Category (CR,EN,VU) / Resident-Migratory (season) / Breeding-Nesting-Pupping (season)**

Hawksbill turtle / *Eretmochelys imbricata* / CR / Migratory / Nesting (March-November)  
Green turtle / *Chelonia mydas* / EN / Migratory / Nesting (October-March)  
Olive ridley turtle / *Lelidochelys olivacea* / VU / Migratory / Nesting (June-November)  
Leatherback turtle / *Dermochelys coriacea* / VU / Migratory / Nesting (May-November?)  
Loggerhead / *Caretta caretta* / VU / Migratory / Non-nesting  
Marine iguana (includes 11 subspecies) / *Amblyrhynchus cristatus* / VU / Resident / Breeding/Nesting (coincides with peak of upwelling)  
American crocodile / *Crocodylus acutus* / VU / Resident / Breeding/nesting

➔ **At risk mammals**

**Common name / Latin name / IUCN Red List Category (CR,EN,VU) / Resident-Migratory (season) / Breeding-Nesting-Pupping (season)**

Galapagos fur seal / *Arctocephalus galapagoensis* / EN / Resident / Breeding/pupping (August-November)  
Galapagos sea lion / *Zalophus californianus wollebaeki* / EN / Resident / Breeding/pupping (May-February)  
Blue whale / *Balaenoptera musculus* / EN / Migratory (Winter) / Calving (winter)  
Sei whale / *Balaenoptera borealis* / EN / Migratory / Breeding (May-July)  
Tucuxi / *Sotalia fluviatilis* / EN / Resident / Breeding (August-October)  
Fin whale / *Balaenoptera physalis* / VU / Migratory / Unknow  
Sperm whale / *Physeter catodon* / VU / Migratory / Breeding (Spring)/Calving (Autumn)