Index

PART I: SUMMARY

1. NAME

Flores Island Biosphere Reserve

2. COUNTRY

Portugal, Autonomous Region of the Azores (**Figure 1**).

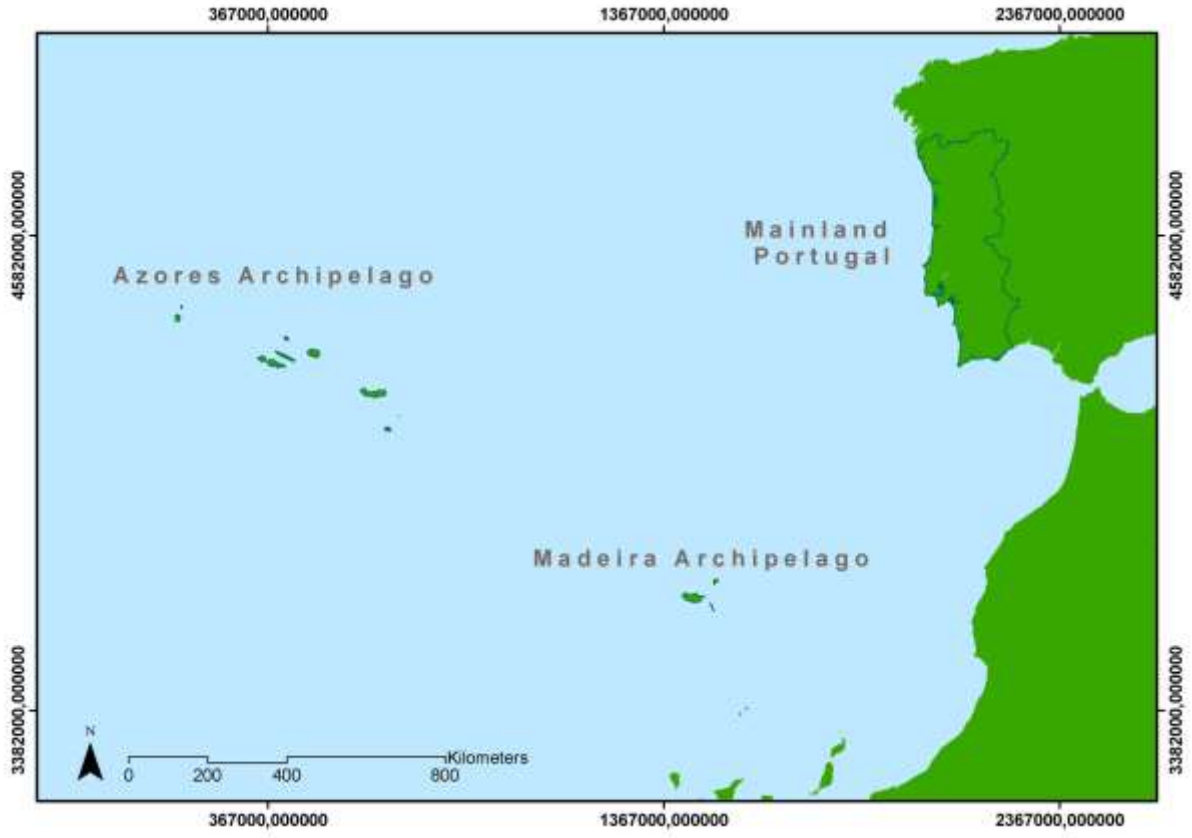


Figure 1. Location of mainland Portugal and its Autonomous Regions.

3. HOW THE CANDIDATE REGION MEETS THE THREE FUNCTIONS OF A BIOSPHERE RESERVE

3.1. CONSERVATION

The proposed Biosphere Reserve is located in Flores Island that belongs to the western group of the archipelago (**Figure 2**). It is the sixth island of the archipelago in

area, with 143km^2 (about 17 x 12.5km) and a maximum altitude of 915m in its central part (Morro Alto). The proposed reserve covers 58,619 hectares and includes the whole emerged area of the island and some adjacent marine area, thus containing important landscape, geological, environmental and cultural assets that are valuable regionally, nationally and internationally.

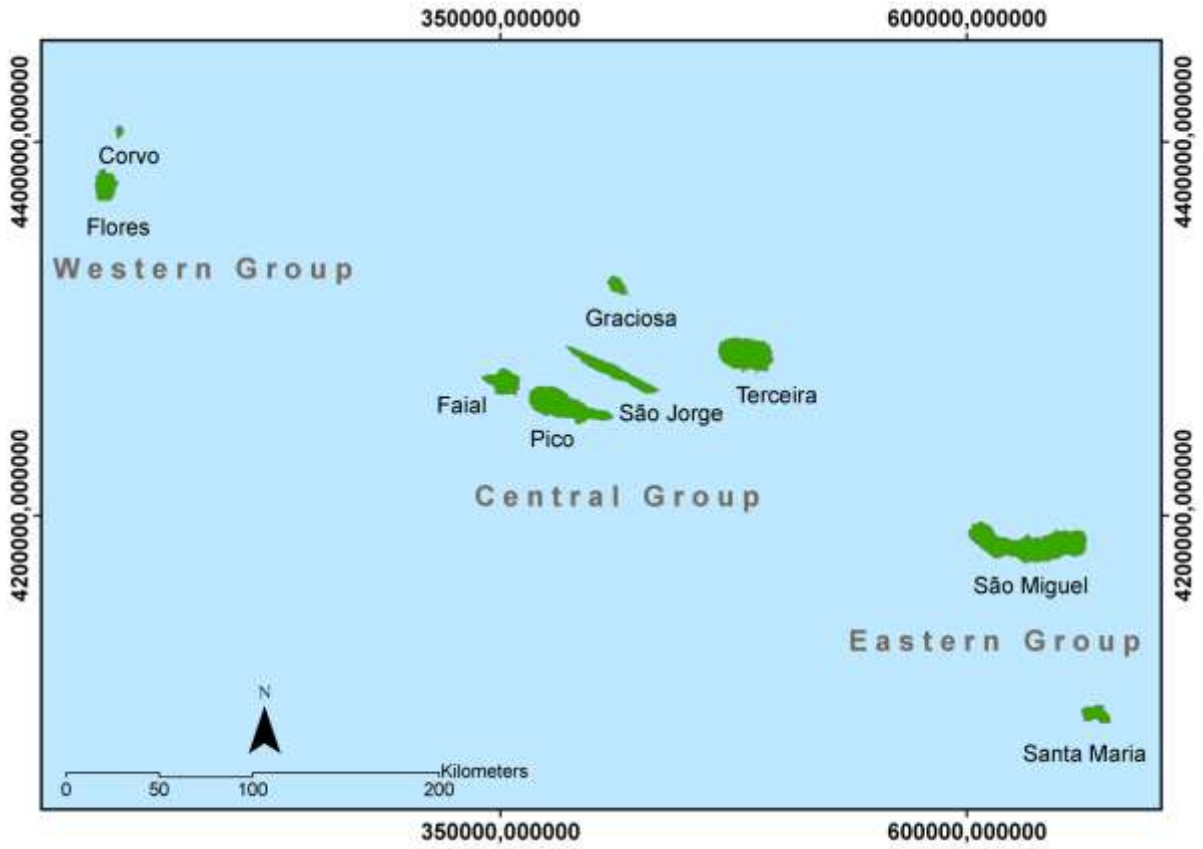


Figure 2. Location of Flores Island in the Azores archipelago.

The proposed Biosphere Reserve contains areas that are of international importance for being the nesting place of important birds species, many of them listed in Appendix I of the Birds Directive of the European Union (EU). It also includes 4 areas of Natura 2000 network of the European Union: 2 Special Protection Areas (SPA) and 2 Sites of Community Importance (SCI). Additionally, 24 natural habitats listed in Annex I of the Habitats Directive of the European Union have been identified, of which five are priority ones.

The island presents vigorous slopes that extend from the interior to the coast in a two step plateau structure where it shows modest volcanic features. In the flat surrounding areas of these cones, ancient sunken craters accumulated water and became lakes of variable depth. The largest peat bogs in the Azores are located in the high and

humid areas of the central plateau of Flores Island. Peat bogs are vital for the water balance of this island that supports streams and waterfalls that in turn characterize its landscape. The raised active peat bogs and wooded peat bogs are classified as priority habitats (Habitats Directive), the latter containing the largest juniper (*Juniperus brevifolia*) forest of the Azores. Wide areas of two other priority habitats, endemic macaronesian heaths and laurissilva forests, surround freshwater lenthic (lakes of various sizes, namely Lagoa Negra, the deepest in the Azores) and lothic (permanent or temporary streams) environments. These habitats, by their geographic location in the Atlantic are very important as resting and feeding areas for the migratorious birds.

Figure 3. Landscape of the island in altitude

Rocha do Bordões is an icon of the island and the archipelago's landscape due to its rare large prismatic structure and it's classified as Natural Monument Regional.

The coastline of the island (**Figure 4**) is vigorously shaped by high cliffs and complemented by many nearshore islets and rocks. The difficult access preserved for centuries the importance of these places as a breeding place for important sea birds.

At the base of the cliffs the deposition and agglomeration of cobbles and boulders gives rise to the so-called "fajãs". Fajãzinha and Fajã Grande (up to Ponta da Fajã) are good examples of such depositions, outlined by an impressive hill on its eastern side, and

characterized by large waterfalls. That of Ribeira Grande, about 300 meters high, is one of the most impressive and symbolic of the contrasting nature of the coastline of Flores Island.

Figure 4. Aspect of the coast of the island.

Flores Island has many Azorean endemic species (195), distributed for several groups, namely bryophytes (5 wich 1 is endemic of Azores), pteridophytes (6), spermatophytes (52), arthropods (101), mollusks (11), fish (1), birds (8) and mammals (1), many of them with a protection status.

It was due to this island's landscape and important natural and cultural patrimony, recognized internationally, that the Government of Azores created the Natural Park of Flores Island. This legal protection status is enforced through the implementation of various levels of management measures according to the figures of protection. It also promotes the preservation and rehabilitation of the ecosystems, habitats and species and harmonization of human relationship with the landscape and a sustainable use of natural resources.

Establishing this island as a Biosphere Reserve will reinforce the legitimacy of the measures implemented by the Natural Park of Flores Island. It will also project it internationally by encouraging activities that value biodiversity, like tourism and export of local products. Research projects that focus on ecosystem management and international cooperation will also be encouraged, as will local incentive to sustainable development that rewards local knowledge and the connection between human activities and biological diversit.

The northern plateau averages 600-700 meters in height and includes Morro Alto, the peaks of Burrinha, Testa da Igreja and Sé. The lower southern plateau is 500 600 meters in height and presents smaller and more The islets of Maria Vaz, Alagoa and Baixa do Moinho stand out for having gained the status of Natural Reserves due to their natural interest. Flores Island has abundant water resources with numerous permanent and secondary water streams that flow all the way down to the coast deeply embedded in the rock. Part of this water is retained in various lakes in the central plateau, while another part infiltrates into underground aquifers at varying depths. When saturation of these reaches the surface near the ponds of the lower plateau marsh areas occur, and vegetation is dominated by altitude moss and Juncus.

Agriculturally suitable areas are reduced to about 10% of the island's surface due to its mountainous features and space limitations imposed by steep slopes, risk of erosion, and poor drainage in high lands. As a consequence, its colonization occurred mainly in the wider and more open low platforms, giving rise to small scattered population clusters. The largest settlements occur in the villages of Lajes and Santa Cruz, the latter representing currently the main urban settlement. Agriculture and livestock farming are the main occupations of the population. Fishing and whale hunting have also developed as a traditional occupation despite the difficult access to the sea in most parts of the island.

In Flores Island landscape has been humanized in a highly cultural way integrating its natural patrimony and allowing the preservation of significant areas that act as a refuge for unique biological and ecosystem assets. Single and double wheeled water mills are a striking feature of such landscapes.

It is also common to observe accidental migratory birds from North America and the Arctic on Flores Island. This is due to its location on the American tectonic plate, halfway between the Iberian Peninsula and Newfoundland, thus presenting favorable conditions for these birds to rest and feed.

3.2. DEVELOPMENT

Although recent estimates indicate a reversal of the declining trend, with 4,059 inhabitants in 2006, the population of Flores Island has suffered a slump in the last century.

Agriculture and livestock farming still play and have always played a major role in the economy of the island.

A key feature of the cultural identity of this population is its strong link to rural areas, despite the majority of the active population being currently employed in the tertiary sector. In the last two decades cattle has gained importance over agriculture and other types of livestock, which resulted in the conversion of agricultural spaces into pasture and a decrease in exploitation diversity. The landscape remains, however, dominated by pasture delimited by basalt walls and low hedges of hydrangeas.

Livestock farming is extensive and used for subsistence and exportation, both of living cattle or of dairy products. Agriculture is also extensive, little diversified and used mainly for subsistence.

A declining population trend and the inadequacy of products to modern markets have negatively affected the economy of the island. As a consequence, municipalities, the regional Government and some local entrepreneurs have focused on restructuring and revitalizing the local economy, namely through the creation and implementation of various instruments (see 17.4). These include territorial and activities management tools, like the Municipal Director Plans (PDM) of both municipalities, the Regional Territorial Planning Act for the Azores (PROTA), the Plan for the Sustainable Development of the Azores (PReDSA) and the Tourism Planning Act for the Autonomous Region of the Azores (POTRAA).

The territorial model recommended by PROTA for Flores Island emphasizes a vast area allocated to nature conservation. This includes large core areas throughout the central part of the island that extend to also vast complementary areas along the coastline that surround all urban and major agricultural areas.

Flores Island is indeed a privileged place to promote environmentally and culturally sustainable human and economic development, due to its ecological and environmental valuable assets that promote the preservation of biodiversity at regional and global levels, and low occupancy characterized by traditional and harmonious cultural values.

These characteristics have long raised the interest of resident and/or visitor researchers in Flores Island, focusing namely on the biology and ecology of organisms, on the characterization of populations, communities and systems, on geomorphological

characterization, on hydrological, vulcanological, climatic and demographic aspects, on social-economic and cultural issues, among others. Considering past and ongoing research activities in Flores Island and given the importance of its location in the narrow context of the archipelago and a broader context of the North Atlantic, it represents an ideal natural laboratory for the implementation of integrated management plans and models. The continuity and deepening of such research and monitoring programs are thus vital to continue the work that has already been undertaken, and to expand research into areas that are directly related to the implementation of a Biosphere Reserve

Although being a good example for natural area management, Flores Island's human activities still require fundamental changes to allow the rise of a sustainable economy that is achievable through the exploitation of the island's natural and cultural features. For example, the natural and cultural diversity and originality of Flores Island have a high potential for tourism, namely emphasizing scientific and nature tourism. Alongside with its unique biological and geological features the proposed Biosphere Reserve also counts on important ethnographic richness and diversity. Great importance is given to the preservation of customs and cultural traits in Flores Island, which is reflected in the authenticity and diversity of cultural events, namely traditional rural festivals that can have high potential for tourism.

The refreshment of the local economy and its social development has to be based on the exploitation of natural and cultural patrimony of the proposed Biosphere Reserve in order to complement or replace current unprofitable practices. The status of Biosphere Reserve for Flores Island is expected to enhance the conversion of activities and valorize the natural and cultural patrimony.

3.3. LOGGISTIC SUPPORT

The Institute of Meteorology does a permanent monitoring system collecting climatic data, including sysmographic and oceanographic components. This monitoring system is handled by the Aeronautic Meteorological Center of the Flores Island, with several stations established in the Island.

The University of the Azores, through its departments located in São Miguel, Terceira and Faial Islands, congregates researchers and provides specialized laboratories and permanent research stations equipped to fully support the development of any projects and lines of research on these islands. Additionally, the Region also has one boat and one oceanographic research vessels, operated by the Department of Oceanography

and Fisheries of the University of the Azores, computerized databases and a Geographic Information System.

There have been several regional, national and international projects focused on or related to Flores Island, covering several areas: biology and ecology of organisms, on the characterization of populations, communities and systems, on geomorphological characterization, on hydrological, vulcanological, climatic and demographic aspects, on social-economic and cultural issues, among others. It was given significant emphasis to the protection and management of territory and natural resources. Results have been used successfully in several other projects, coordinated by the Government of Azores. Such projects focused on management and planning of the patrimony of the island resulted in the development of various plans (e.g. Natura 2000 Management Plans - terrestrial and marine areas; Regional Plan for the Sustainable Development of the Autonomous Region of the Azores; Coastal Management Plan for Flores Island) and legal figures (e.g. Natural Park of Flores Island). New projects are starting up or already ongoing, which will continue the work that has been already undertaken, and also increase research in areas that are directly related to the implementation of the Biosphere Reserve, namely in what concerns social-economic, management and monitoring aspects.

The results obtained in several projects have been also used to increase environmental awareness, education and information, promoted both in and out of Flores Island. Ecoteca das Flores plays an important role by providing a suitable space that ensures the logistical support required for the development of such actions. The Center for Environmental Interpretation and Cultural of Boqueirão built by the Regional Government provides a multidisciplinary structure based on new technologies that aim to increase interest for the knowledge on habitats, natural resources and the study of the Ocean.

The logistical support that Flores Island has provided for research, training and environmental education is expected to extend and increase with the centralization of the management mechanisms of the proposed Biosphere Reserve and with the creation of mechanisms to promote the area at local, regional and international levels.

4. CRITERIA FOR DESIGNATION AS A BIOSPHERE RESERVE

4.1. ENCOMPASS A MOSAIC OF ECOLOGICAL SYSTEMS REPRESENTATIVE OF MAJOR BIOGEOGRAPHIC REGIONS, INCLUDING A GRADATION OF HUMAN INTERVENTION

Flores Island, 143km^2 in area and 914 meters maximum altitude in Morro Alto (in the central part of the island), presents unique landscape, geological, environmental and cultural assets of regional, national and international importance. The central plateau is higher in the northern side where Morro Alto is located (about 600-700 meters high), and lower in the southern side where a regionally important set of lakes is located (500 to 600 meters high). High cliffy shores ornamented with small islets dominate most of the island's littoral. It is even possible to find fossil cliffs in the interior part of Flores Island that have resulted from the oscillation of the sea level through the ages. Heavy rain and the characteristic vegetation of the high central part of the island (peat bogs) give rise to a high hydrologic potential. The result is a radial arrangement of abundant water streams that flow towards the coast, sometimes encountering suspended valleys and forming spectacular waterfalls.

Construction is still today restricted to the lower areas near the sea, as when Flores Island was firstly colonized by humans due to the geomorphology of the island. This, however, has not prevented profound changes to the natural environment in the last five hundred years due to deforestation for extraction of inert material (sand and gravel), introduction of exotic species of fauna and flora, and more recently the increase in agriculture. The landscape in Flores Island is currently much more heavily humanized. However, there are still nearly untouched habitats in the highest parts of the island or in coastal parts that are of difficult access such as cliffs and islets, where most environmental patrimony is concentrated.

The flora of this island is dominated by humid macaronesian laurissilva woodlands, like that of southern Europe and North Africa before the last glaciation. Patches of this vegetation in the high lands of the island, including the largest population of the endemic juniper species of the Azores (*Juniperus brevifolia*), are a valuable natural asset. These habitats are designated as Priority Habitats under the European Habitats Directive

Wide areas of two other priority habitats, endemic macaronesian heaths and laurissilva forests, surround freshwater lenthic (lakes of various sizes, namely Lagoa

Negra, the deepest in the Azores) and lothic (permanent or temporary streams) environments.

Forest and agricultural land prevail at medium and low altitudes and are dominated by introduced species like *Hydrangea macrophylla* used to divide the parcels of land. Recent increase in agriculture, especially in livestock exploitation, is slowly going back to smoother, environmentally friendlier techniques that increase its value.

Marine birds are one of the major biological assets of Flores Island that has been preserved from human impact due to difficult accessibility to most coastal zones. These birds, endangered throughout the world, can find refuge for nesting and to rest on islets and cliffs around the island. The proposed Biosphere Reserve is a particularly important area for the pink stern (*Sterna dougallii*), classified as vulnerable. Its colony on Flores Island represents 40% of the total European population. High conservation value species such as the dragon tree (*Dracaena draco*) also occur on these cliffs, sometimes fossil ones, where natural vegetation grows unthreatened.

A substantial part of the proposed Biosphere Reserve consists of a habitat and species rich marine area that is important in an international and regional context. This area supports traditional fisheries that are regulated to ensure their sustainability, and simultaneously attracts valuable tourism interest, namely for diving, whale and dolphin watching and shore walking trails.

4.2. BE OF SIGNIFICANCE FOR BIOLOGICAL DIVERSITY CONSERVATION

Flores Island has the highest number of endemic species per unit area of the archipelago, surpassed only by Corvo, which reflects its great biotope diversity and unaltered vegetation areas. This island is an important reserve of *Azorina vidalii* and two species that occur exclusively in the western group, *Myosotis maritima* and *Euphrasia azorica*. The set of over 100 dragon trees (*Dracaena draco*) on the cliff of Lages (**Figure 5**) is unique in the Azores. The laurissilva forests in the upper areas of the island, including the largest population of endemic juniper (*Juniperus brevifolia*) also constitute a valuable natural patrimony.

Of a total of 103 endemic species, 89 are exclusive to the Azores, thus conferring to Flores great wealth. Regarding terrestrial plants, there are 64 endemic species, 51 endemic to the Azores, 7 endemic to Macaronesia and 6 endemic to Europe. There are 28 endemic invertebrate species, of which 23 are arthropods and 5 are molluscs. There is only one fish species endemic to the Azores (the blue wrasse *Centrolabrus caeruleus*,

Figure 6) and 8 endemic subspecies of birds. Two species of bats, the Azores bat (*Nyctalus azoreum*) the unic mammal species endemic to the Azores and considered endangered and the Madeira pipistrelle (*Pipistrellus maderensis*) endemic to Macaronesia with reduced abundance in the Azores. Both species are included in Annex IV of the Habitats Directive of the European Union, with strict protection status.

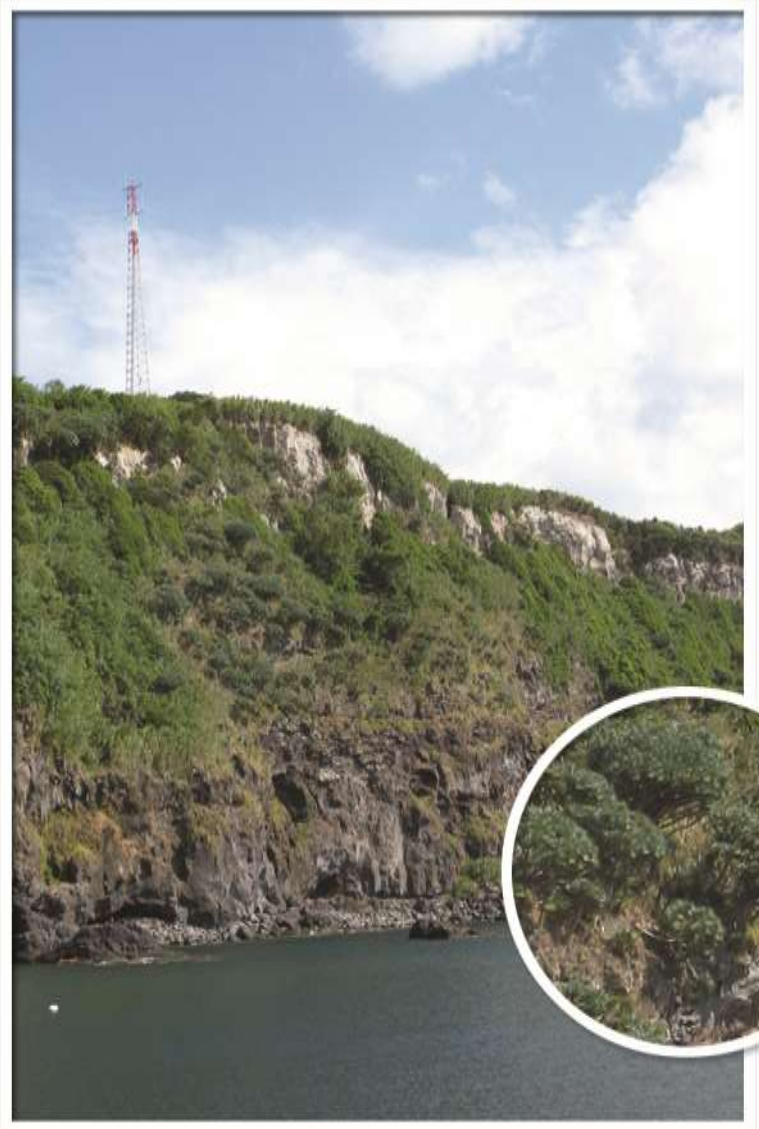


Figure 5. Dragon trees (*Dracaena draco*) on the cliff of Lages.

Flores Island provides nesting place for important species of birds, which constitute areas of international importance and are thus listed in Appendix I of the Birds Directive of the European Union. Flores Island has 4 areas included in Natura 2000 - 2 Special Protection Areas (SPAs) and 2 Sites of Community Importance (SCI) - and 24 natural

habitats listed in Annex I of the Habitats Directive of the European Union, five of which are considered priority ones.

There are several organisms with conservation importance and commercial and cultural interest in the marine area of the proposed Biosphere Reserve, namely limpets (*Patella aspera* and P*. candei*), the dusky grouper (*Epinephelus marginatus*, **Figure 7**) and the island grouper (*Mycteroperca fusca*). There are also several species of cetaceans (all listed in Annex IV of the Habitats Directive) with increasing importance in terms of nautical tourism.

Figure 6. *Centrolabrus caeruleus*, endemic species of Azores.

Local fishermen are the main users of marine resources. The main marine exploitation recreational activities are near-shore fishing (cane and troll), spearfishing and harvesting octopus (*Octopus vulgaris*), limpets (*Patella* spp.) and the red alga *Porphyra* sp., commonly referred to as "erva-patinha". The most used fishing gear are hand-line and pole-and-line for demersal fish and tuna, and on rare occasions bottom long-line. Among the most explored species are the red sea bream (*Pagellus bogaraveo*), the wreck-fish (*Polyprion americanus*), the red porgy (*Pagrus pagrus*) and tuna. Traditional fisheries have been managed to ensure compatibility with the preservation of such exploited resources.

Although of the increase in mechanization and use of additives in recent years, extensive farming still uses many traditional agricultural techniques and is well developed and diversified. Extensive livestock exploitation, focusing mainly on cattle, has been declining in recent decades.

Figure 7. Dusky grouper (*Epinephelus marginatus*).

Currently the Autonomous Region of the Azores is equipped and prepared to properly regulate economic activities towards environmental preservation. The isolation of these islands increases the need to combine development and sustainability, as quality needs to precede quantity to achieve competitive advantage.

The classification of Flores Island as a Biosphere Reserve will enhance the effort that is being done at a regional level to promote the conservation of ecosystems, biodiversity and natural resources and to ensure compatibility with social-economic development.

4.3. PROVIDE AN OPPORTUNITY TO EXPLORE AND DEMONSTRATE APPROACHES TO SUSTAINABLE DEVELOPMENT ON A REGIONAL SCALE

The nature, history and the socio-economic and natural reality of Flores Island, in addition to its size, provides optimal conditions for the development of innovative

actions, experimental and demonstrative, in a logical and observable scale in terms of sustainable development.

Nature conservation, the agro-rural techniques, fishing, tourism and leisure sectors are of excellence for the development of initiatives and projects which reach, beyond demonstrative, may contribute significantly and visibly to the sustainability of the island itself and of its inhabitants.

In a way, the Biosphere Reserve will unify a valid set of sectoral initiatives that have been developed over recent years and, consequently, its results can, and should, be cause for consolidation of a regional dynamic surrounding the sustainability of the Azores archipelago.

The Biosphere Reserve will be a catalyst that will join infrastructures and human resources around historical, social, natural and economic values that also present opportunities for enhancement of activities, goods, products and services that the Flores Island has to offer.

Moreover, the Flores Biosphere Reserve will integrate the dynamics under way within the REDBIOS (Network of Biosphere Reserves of the Eastern Atlantic), together with the Biosphere Reserves of Corvo and Graciosa islands, extending cooperation and, consequently broadening the vision of sustainable development throughout the Autonomous Region of the Azores.

4.4. HAVE AN APPROPRIATE SIZE TO SERVE THE THREE FUNCTIONS OF BIOSPHERE RESERVES

The area proposed for Biosphere Reserve includes the entire island of Flores and a significant marine area surrounding this island, making, as the total reserve area of 58,619 ha. Although the total area of the island of Flores is relatively low, this island incorporates an important diversity of habitats with regional, national and international relevance, namely those areas included in Natura 2000.

The inclusion of a vast marine area promotes in an explicit way, along with conservation, a practice of integrated management of terrestrial, coastal and marine environments.

In summary it can be said that the size and general characteristics of Flores Island allows it to operate in order to integrate the environmental, economic and social components, along with the administrative dimension (and functional) on a scale adjusted to their reality. The dimensions and proposed zoning allows a good implementation of the functions of conservation, development and logistic support,

inherent in a Biosphere Reserve. The dimensions proposed for the different types of areas are sufficient to allow the perennial preservation of natural values. The buffer zone was designed and sized to operate as a protective membrane of the most important natural values, located in the core area and at the same time guarantees the local socio-economic development through the promotion of sustainable practices and values of use of natural and socio-cultural resources.

4.5. THROUGH APPROPRIATE ZONATION

a) A legally constituted core area or areas devoted to long term protection, according to the conservation objectives of the biosphere reserve, and of sufficient size to meet these objectives?

The core areas coincide with the protected areas defined in the Natural Park of Flores Island and with the categories of Natural Reserve or Natural Monument, namely (**Figure 8**):

- Natural Reserve of Morro Alto
- Natural Reserve of Maria Vaz Islet
- Natural Reserve of Alagoa and Baixa do Moinho Islets
- Natural Monument of Rocha dos Bordões

Natural Reserves are defined in the Regional Legislative Decree No.15/2007, of June 25 as areas that comprise terrestrial or marine ecosystems with one or more exceptional or representative biological singularities. These can include areas of natural and semi-natural habitats with threatened species of flora and fauna of high scientific interest, without permanent or significant human presence, with little or no human intervention, and if so with low impact that is likely to be corrected. Natural Reserve management aims at preserving species of flora and fauna and the conditions of natural and semi-natural habitats, and at restoring ecological equilibrium through scientific research and monitoring. Natural Monuments are defined in the same Regional Legislative Decree as protected areas especially suited for the conservation of specific natural features. These can include geological, palaeontological, aesthetic and/or cultural features of exceptional interest, either due to their representativeness or to their rarity and aesthetic quality.

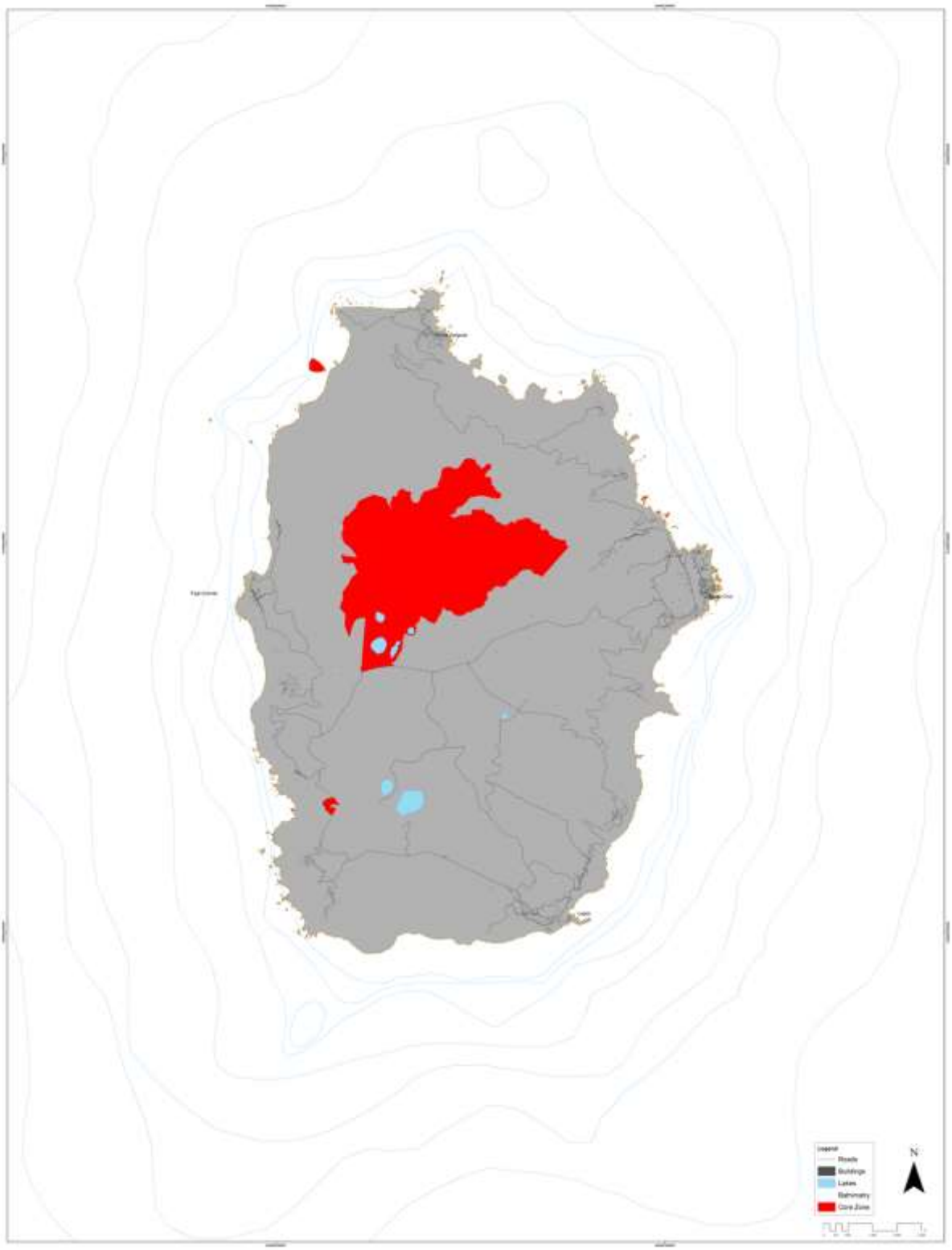


Figure 8. Core areas proposed for Flores Island as Biosphere Reserve.

- **Natural Reserve of Morro Alto**

The main aim of protecting this uniform landscape of 1.592,8 ha in area is to preserve what are generally called altitude peat bogs. These consist of wetlands that are covered in moss of the gender Racomitrium, commonly known as sphagnum, and play a crucial role in regulating the water cycle, mainly due to:

- Their efficiency in intercepting visible and invisible precipitation;
- Their capacity to retain water at the surface, that works as a suspended water reservoir;
- Their regulating function in water infiltration, subsuperficial and underground drainage and soil erosion;
- Their influence in the island's micro-climate;

The increasingly smaller coverage of such vegetation as a result of increasing human intervention is the main justification for the protection of this area. The intention is to prevent further disturbance in the hydrological cycle of such a unique habitat that occurs on Flores Island.

Peat bogs are also associated to high plant diversity which increases their conservation interest.

- **Natural Reserve of Maria Vaz, Alagoa and Baixa do Moinho Islets**

Constructive geological processes like volcanism haven't been recorded on Flores Island for over 3000 years, and thus its coast is mainly affected by erosive processes like marine abrasion. The result of a series of complex geological processes is a quite scenic and spectacular set of cliffs, islets and "fajãs". The entire coastline of these islands was used as nesting spot by many populations of seabirds before the human colonization started. However, the descriptions of such a phenomenon made by Gaspar Frutuso, an important chronicler of the XVI century, are difficult to believe in current days. Human interference through land use and the introduction of predators like rats and cats has led to a sharp decline in the original density of seabirds, restricting their habitat to coastal inaccessible places, such as cliffs and islets. These Natural Reserves are intended to protect an area of 11.6 ha to ensure the integrity of nesting sites of important populations of seabirds, some of them of international importance like the pink stern (*Sterna hirundo*).

- **Natural Monument of Rocha dos Bordões**

With an area of 10.29 ha, this geological formation is unique in the Azores and consists of a set of large vertical basalt columns. It resulted from the rapid cooling of a thick layer of basalt that was thus subject to prismatic disjunction. The solidification occurred inside a volcanic cone that was subjected to erosive processes thus exposing its interior. Several water streams flow down this basaltic rocks and form a waterfall (**Figure 9**).

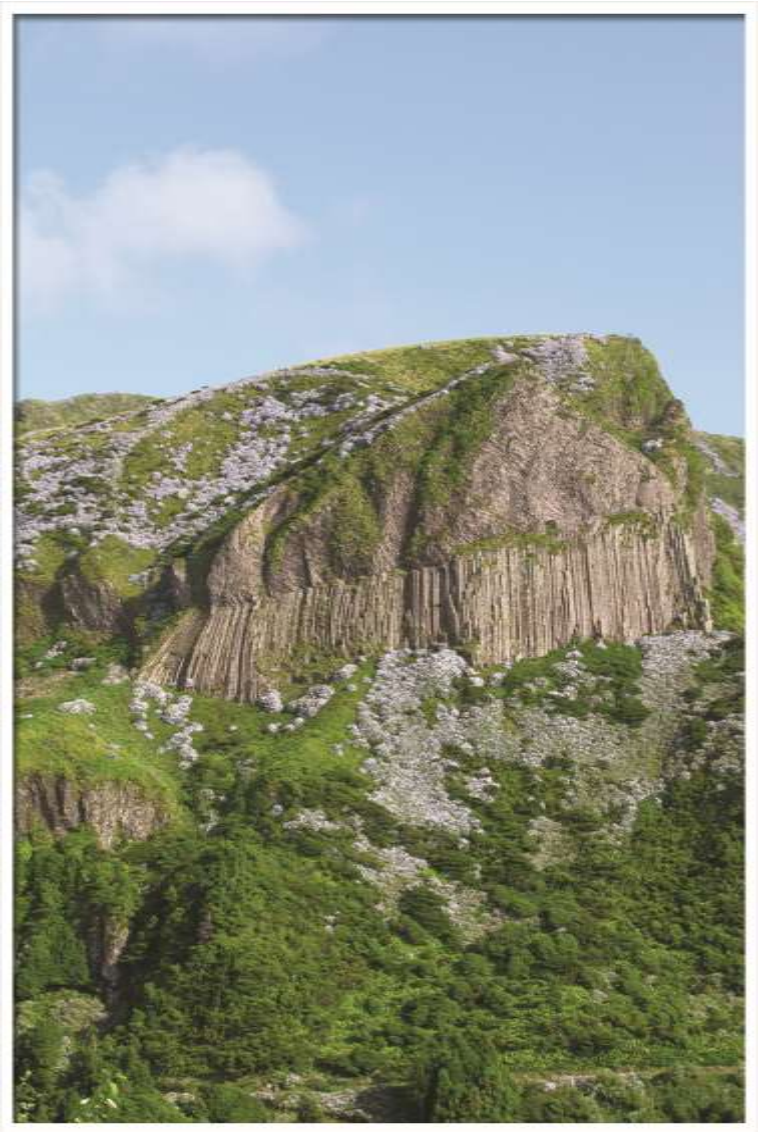


Figure 9. Natural Monument of Rocha dos Bordões.

b) A buffer zone or zones clearly identified and surrounding or contiguous to the core area or areas, where only activities compatible with the conservation objectives can take place...

The buufer areas coincide with the protected areas defined in the Natural Park of Flores Island and with the categories of Protected Area for the Management of Habitats or Species, Protected Landscape area and Protected Area for Resource Management, namely:

- Protected Area for the Management of Habitats or Species of Caldeira Funda and Caldeira Rasa;
- Protected Landscape Area of Zona Central (Central Zone);
- Protected Area for the Management of Habitats or Species of Costa Norte (North Coast);
- Protected Area for the Management of Habitats or Species of Costa Sul (South Coast);
- Protected Area for the Management of Habitats or Species of Ponta da Caveira;
- Protected Landscape Area of Costa Norte (North Coast);
- Protected Area for Resource Management of Costa Norte (North Coast).

Buffer areas consist mainly of public domain areas and comprise a total area of 7.142,8 ha, of which 3.973,8 ha are marine and 3,169 ha are terrestrial (**Figure 10**).

Protected Areas for the Management of Habitats or Speciest are defined for the active recovery of particularly important habitats or species, with a view to its recovery.

Protected Landscape Areas, marine or terrestrial, are defined where the interaction between man and nature have produced diverse and harmonic scenic and aesthetic landscape features that support biological, geological or significant cultural value. They can also aim at creating territorial uniformity and biological corridors. This classification foresees management practices to preserve landscapes through the maintenance and enhancement of natural or semi-natural scenery values and the maintenance and promotion of compatible economic activities.

Protected Areas for Resource Management aim to preserve natural and semi-natural habitats and species of flora and fauna, and foresees the adoption of measures that support the compatibility between the sustainable use of resources and the maintenance of their ecological quality.

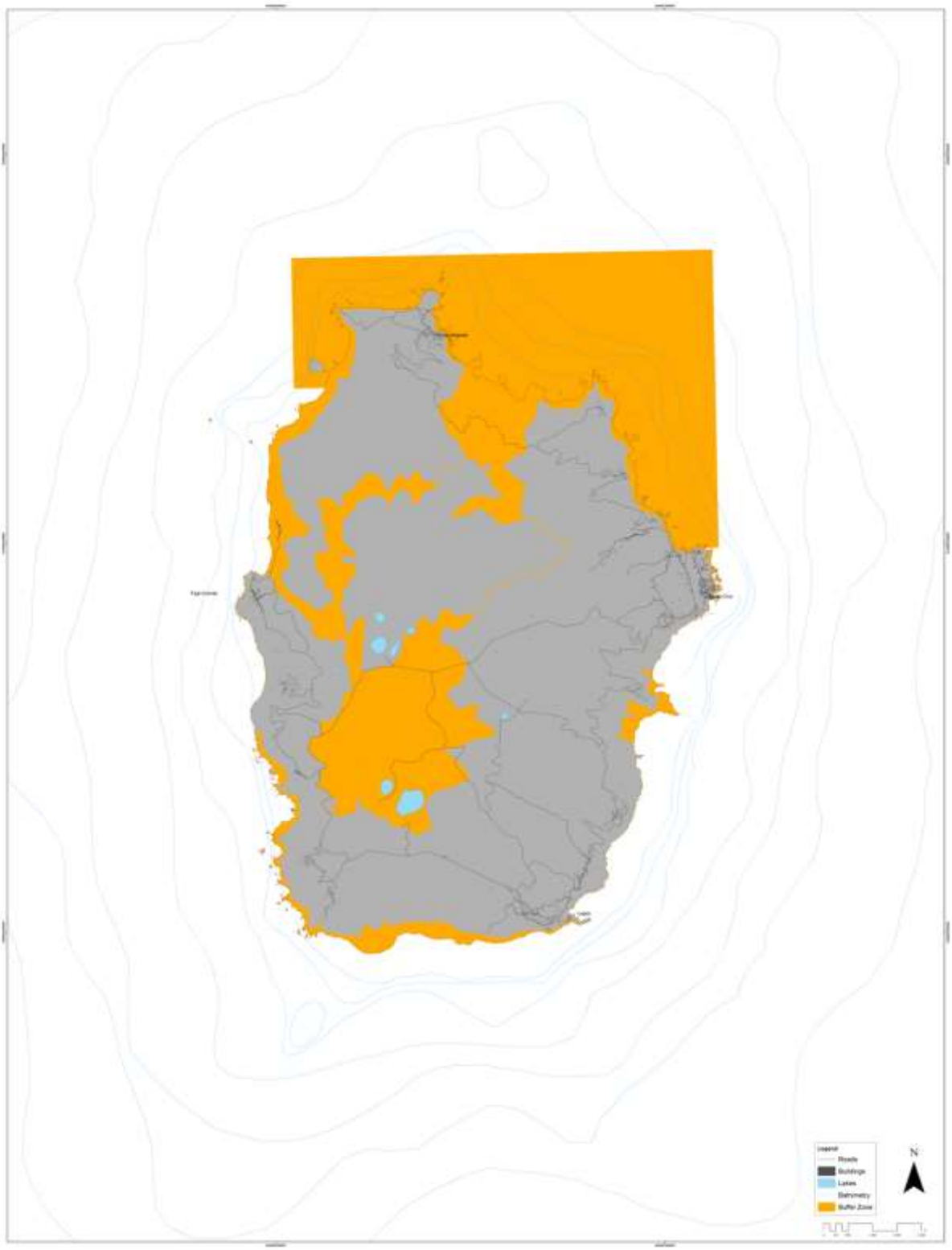


Figure 10. Buffer Areas proposed for the Flores Island Biosphere Reserve.

- **Protected Area for the Management of Habitats or Species of Caldeira Funda and Caldeira Rasa**
- **Protected Landscape Area of Zona Central**

To increase the effectiveness and efficiency of protected area management, based on the concept of ecological corridor and the principle of territorially unifying contiguous protected areas, these two areas (426 ha and 1.390,6 ha respectively) complement each other and the Natural Reserve of Morro Alto.

The central area is dominated by peat bogs and cedar (*Juniperus brevifolia*) and a large wetland complex. The lower southern part exhibits great habitat diversity (various types of wetlands and woodlands), smaller in size and more affected by pasture spread. A striking feature of these areas is the presence of large lakes (**Figure 11**). These occur in large number and their location at high altitudes gives them an important role in the maintenance of the fragile hydrogeological balance of the island, by continuously supplying and maintaining water levels, thus working as regulators of water sources. They feed downstream water courses and absorb upstream ones, especially in winter, and support the climatic characteristics of the surrounding areas through the stabilization of evaporation rates throughout the year. The Central Zone of Flores Island is proposed as a RAMSAR site.

Figure 11. Lagoa Rasa (top) and Lagoa Funda (bottom).

The main activities in these areas are agriculture, forestry, extraction of inert material (sand and gravel) and tourism, that cause impacts on the landscape such as landslides, pasture and roads, that lead to the loss of species due to the fragmentation of their natural habitat and the progressive advance of exotic species and the eutrophication of some wetlands.

- **Protected Areas for the Management of Habitats or Speciest of North Coast, South Coast and Ponta da Caveira**
- **Protected Landscape Area of Costa Norte (North Coast)**

These four protected areas of 504 ha, 3.973,8 ha, 74.8 ha and 516.3 ha, respectively, share a common goal of preserving landscape, habitats and species associated with coastal areas of the island. The coastline of Flores Island is composed by extensive high cliffs cut by ditches with streams and waterfalls, presenting a complex system of bays, rocky beaches, natural terraces, submerged and semi-submerged caves and small islets near the shore. It covers a range of important habitats, some of them endemic and critical for several species of seabirds to nest. Grazing and tourism have some impact on this area as well as fishing, diving and swimming activities that threaten to destroy vegetation and consequently induce soil erosion in coastal cliffs, thus reducing the available habitat suitable for nesting seabirds. These activities might also affect the seabirds' reproductive success due to predation and trampling of nests and chicks, and possibly also lead to the abandonment of nests.

- **Protected area for resources management of Costa Norte (North Coast)**

This area is entirely marine and extends from the shoreline to a depth of 100m, occupying an area of 3.973,8 ha.

The bottom consists mostly of irregular bedrock near the coast and in some places it is possible to find pockets of coarse sand and gravel. There are places, however, where boulders dominate, lying on the rocky bedrock or on the sediment. Submerged and semi-submerged caves, small arches and tunnels are common along the shores of Flores Island. As depth increases, the slope of the bottom decreases, while keeping its rocky and uneven nature. The transition to sediment bottoms is gradual with highly stable boulders sitting either on bedrock or on sediment. Boulders are generally large with angular smooth surfaces, but can at times alternate with smaller, more rounded ones. Deeper sediment bottoms are usually of mineral medium sized and/or gross grain sand. Islets with vertical walls and seamounts with irregular surfaces rise from these bottoms

and create perfect conditions for leisure activities such as swimming, fishing and diving that consequently lead increased traffic of vessels.

c) An outer transition area where sustainable resource management practices are promoted and developed

Most of the proposed Biosphere Reserve (85%) is covered by the Transition Area (**Figure 12**), which includes a terrestrial component with 9.331,6 ha and a marine one with 40.528,9 ha that extends 3 miles from the coastline (or from the limit of the Protected Area for Resource Management of Costa Norte), reaching depths of 1000m. The marine component is widespread and encompasses a wide variety of habitats and activities. It is exploited by fishermen using small fishing boats and traditional fishing techniques, mainly for self subsistence and local consumption. Exports are mainly of red sea bream (*Pagellus bogaraveo*), caught with hand line. Water sports show a tendency towards diversification and are becoming increasingly popular. Scuba diving in Flores Island has a high reputation and there is a growing demand for nautical-tourism, namely regarding boat tours for coast watching and for observation of cetaceans. Recent legislation of such activities is intended to promote new business opportunities with high economic potential while valorizing the natural resources, provided an environmental balance is kept.

Although there is still some extraction activity (sand, gravel and rock), livestock, agriculture and forest occupy the largest areas of the terrestrial component of the Transition Area. Livestock production has been declining recently, and there has been a strong adhesion by farmers from Flores Island to Governmental support to make this activity extensive (currently covering about 3,000 hectares, which represents 1/3 of the terrestrial area of the Transition Zone). The rationale is to diversify domestic supply, thus reducing dependence on the outside, by investing in the production of high added value products for exportation and capitalize on the potential of the island.

The implementation of Flores Island as a Biosphere Reserve will certainly assist in its international projection and attract financing and the establishment of economic, research and monitoring partnerships that ensure compatibility between human activities and the conservation of natural resources.

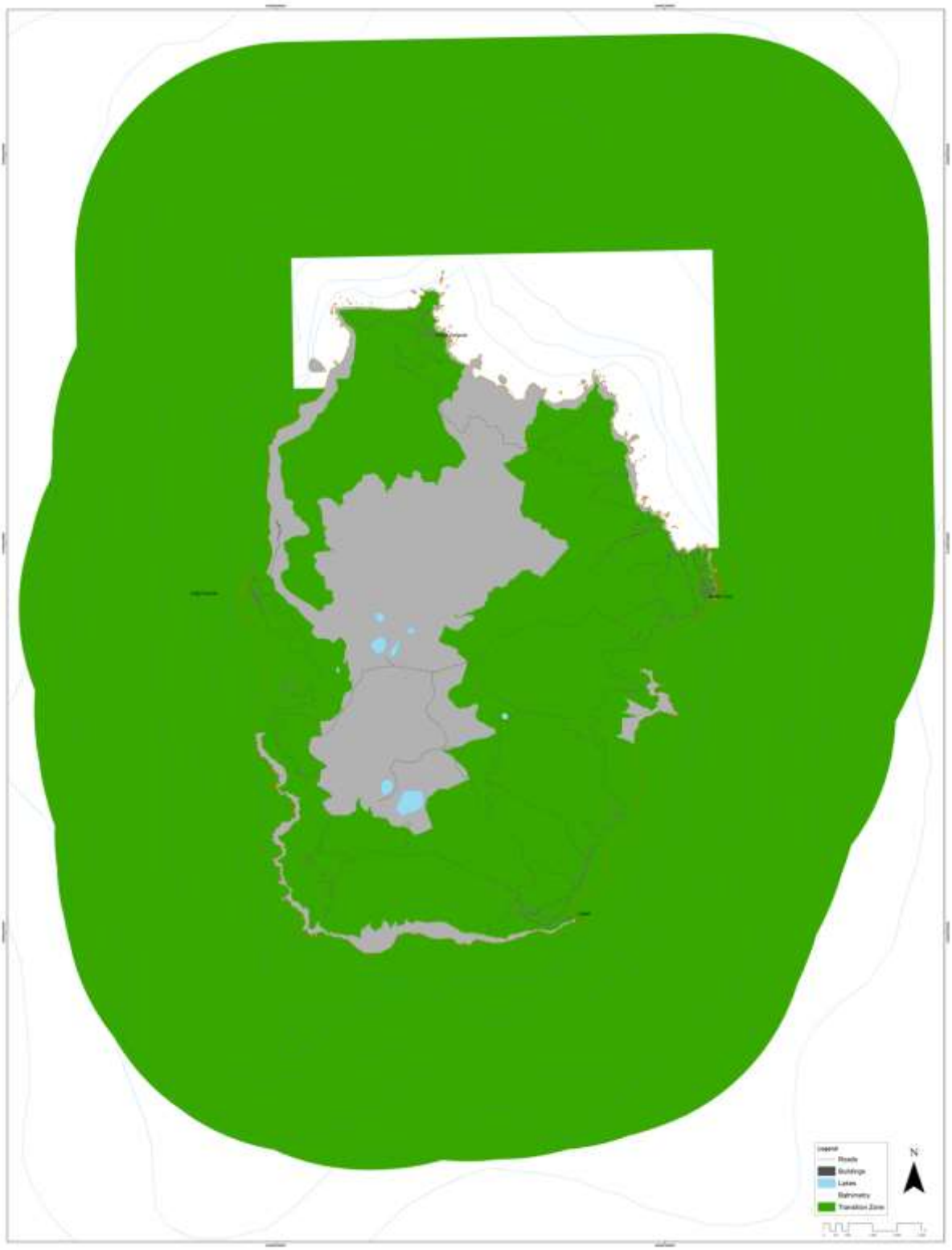


Figure 12. Transition Zone proposed for the Flores Island Biosphere Reserve.

4.6. ORGANIZATIONAL ARRANGEMENTS SHOULD BE PROVIDED FOR THE INVOLVEMENT AND PARTICIPATION OF A SUITABLE RANGE OF INTER ALIA PUBLIC AUTHORITIES, LOCAL COMMUNITIES AND PRIVATE INTERESTS IN THE DESIGN AND THE CARRYING OUT OF THE FUNCTIONS OF A BIOSPHERE RESERVE

In addition to the initiatives already undertaken during the elaboration process of the application, that included public debates, conferences and a public consultation on line of the candidacy project, the Biosphere Reserve of the island of Flores foresee the creation of an advisory body consisting of representatives of local interests, which will participate in the management of the Natural Park of Flores island and the Biosphere Reserve proposed.

The small size of the island and its population helps a permanent direct contact through which encourage active participation and mobilize the majority of the population in the affairs of the Biosphere Reserve.

4.7. MECHANISMS FOR IMPLEMENTATION

a) Mechanisms to manage human use and activities in the buffer zone or zones?

There are various mechanisms to manage activities related to the terrestrial component of the Buffer Area(s) like the FEADER - European Agricultural Fund for Rural Development 2007-2013 (code of good agricultural practice), implemented in the Azores by the Prorural Program. At a regional level there is the POOC – Coastal Management Plan, the Sectorial Plan of Natura 2000, the POTRAA - Tourism Planning Act for the Autonomous Region of the Azores, the PRA - Regional Water Plan, the PROTA - Regional Territorial Planning Act for the Azores (in public discussion phase), and at a municipal level there is the PDM - the Municipal Director Plan.

Guidelines set by the Island Natural Park of Flores Island are to be applied to the marine Buffer Zones and legal mechanisms for the management of commercial species like limpets and groupers will be added.

b) A management plan or policy for the area as a biosphere reserve?

Will be given sequence to the lines of action established in several instruments and operational programmes, including the Regional Plan for Land Use of the Azores, the Plan for Sustainable Development of the Autonomous Region of the Azores, Plan of Tourist

Order of the Region, Sectoral Plan for the Natura 2000 in the Azores and future Natural Park of Flores island.

For the buffer and transition zones, in addition to the above mentioned instruments, it will be added too the Rural Development Plan of the Autonomous Region of the Azores, in the framework of the mechanisms to manage the humane activities.

In addiction it will be developed a specific Management Plan for the Biosphere Reserve, integrating and stimulating an active participation of the local community.

c) A designated authority or mechanism to implement this policy or plan?

The Regional Network of Protected Areas of the Azores (REAPA) gives expression in the Autonomous Region to the classification defined by IUCN - the International Union for Conservation of Nature, with the necessary adjustments to the biogeographical, environmental, socio-cultural and political-administrative conditions of the Azores archipelago.

The REAPA proposes the creation in each island of an Island Natural Park (INP), which is the basic unit of management of REAPA.

The management system of REAPA is currently in development and in the case of Flores island, the draft (INP) is in the final stages of approval, after public consultation and discussion.

d) Programmes for research, monitoring, education and training?

Research

Various research topics on Flores Island have been approached by higher education research programmes, implemented mainly by the University of the Azores. There are currently several ongoing INTERREG IIIB Programme projects in partnership with other Macaronesian regions (see 15.1.3) that focus on the study of the biology and ecology of various species, ecological modelling, and habitat restoration, among others. Research is expected to increase with the implementation of the proposed Biosphere Reserve. Due to its importance in the archipelago and in the North Atlantic in terms of natural assets, Flores Island will be used as a laboratory to study the implementation of integrated and sustainable management pratices. It is worth mentioning a rising project from the MIT-Portugal with the support of the Regional Government entitled "Green Islands", intended to collect information on local energy resources, the way energy is used in the Azores, and how it can be used in the future.

Monitoring

The managing authority of the proposed Biosphere Reserve proposal shall ensure monitoring programmes and plans to evaluate the results of its management measures. Monitoring programmes will be approved together with the Natural Park of Flores Island, while all ongoing and planned monitoring plans from existing research programs and contract projects shall continue.

Environmental education and training

The Office for Environmental Promotion of the Regional Secretariat for the Environment and Sea has locally and regionally promoted actions of sustained participation, information, dissemination, awareness raising, education and training (see Section 15.2.1). Flores Island is integrated in the Regional Network of Ecotecas and its Ecoteca (see Section 15.2.2) provides privileged logistical conditions to build up new environmental values and behaviour, by promoting reflection, critical spirit, discussion and active participation in the search for viable solutions for environmental problems.

The University of the Azores and the Regional Government have raised environmental awareness through various projects, distribution of materials and various other actions. In the past, in a now disabled center of the Vocational School of São Jorge in Flores Island, training was given in areas relevant to the development of social-economic activities. The Center for Treatment and Recovery of Organic Waste of Flores integrated into PEGRA - Waste Management Strategic Plan of the Azores is also a means for enhancing environmentally friendly practices and behaviors. The construction of the Center for Environmental Interpretation and Cultural of Boqueirão will provide a scientific/cultural museum focusing on the connection of the population of Flores Islands the sea. This facility is intended to arouse the interest of visitors to the knowledge of habitats and natural resources, namely to the study of the Oceans. Two diving centres, Hotel Ocidental (Santa Cruz) and Clube Naval das Lajes offer the possibility of a close contact with the underwater world.

The proposed Biosphere Reserve shall constitute a development model focused on the conservation of the environmental and cultural patrimony. Integrated management of resources and habitats is expected to have an important impact on the implementation of similar measures in other islands of the region and even other areas with similar characteristics.

5. ENDORSEMENTS

5.1. SIGNED BY THE AUTHORITY/AUTHORITIES IN CHARGE OF THE MANAGEMENT OF THE CORE AREA(S)

Full name: _____

Title: _____

Date: _____

5.2. SIGNED BY THE AUTHORITY/AUTHORITIES IN CHARGE OF THE MANAGEMENT OF THE BUFFER ZONE(S)

Full name: _____

Title: _____

Date: _____

5.3. SIGNED AS APPROPRIATE BY THE NATIONAL (OR STATE OR PROVINCIAL) ADMINISTRATION RESPONSIBLE FOR THE MANAGEMENT OF THE CORE AREA(S) AND THE BUFFER ZONE

Full name: _____

Title: _____

Date: _____

5.4. SIGNED BY THE AUTHORITY/AUTHORITIES, ELECTED LOCAL GOVERNMENT RECOGNIZED AUTHORITY OR SPOKESPERSON REPRESENTATIVE OF THE COMMUNITIES LOCATED IN THE TRANSITION AREA

Full name: _____

Title: _____

Date: _____

5.5. SIGNED ON BEHALF OF THE MAB NATIONAL COMMITTEE OR FOCAL POINT

Full name: _____

Title: _____

Date: _____

*** See also support statements in page 209.**

PART II: DESCRIPTION

6. LOCATION (LATITUDE AND LONGITUDE)

Latitude: 39°24'N

Longitude: 31°11'W

Northern limit: 39°34'N

Southern limit: 39°19'N

Western limit: 31°20'W

Estern limit: 31°36'W

7. Area (see map)

The total area of the proposed Biosphere Reserve is 58,619 ha.

7.1. SIZE OF THE CORE ZONE(S)

Approximate Area: 1,615 ha.

7.2. SIZE OF THE BUFFER ZONE(S)

Approximate Area of the terrestrial component: 3,169 ha.

Approximate Area of the the marine component: 3,974 ha

7.3. SIZE OF THE TRANSITION ZONE(S)

Approximate Area of the terrestrial component: 9.332 ha.

Approximate Area of the the marine component: 40.529 ha.

7.4. JUSTIFICATION

The core areas include all Natural Reserve areas (the highest protection status) and one Natural Monument. The criteria for the designation of a Natural Reserve and those set for the designation of core areas by the Seville Strategy coincide in requiring that these should be properly protected sites for monitoring and conservation of ecosystems with minimum disturbance. These also require unchanged natural or semi-natural habitats, or only slightly altered by human intervention. Established management

standards, scientific research and environmental monitoring are also mandatory to ensure the maintenance of the initial conditions or the potential recovery of imbalances.

Buffer zones fully correspond to areas that are legally protected under the classification categories IV to VI of the IUCN. The management objectives of these categories include the adoption of measures aimed at the restoration of natural or semi-natural habitats and important species of flora and fauna, at the preservation of landscapes (through their maintenance and enhancement and the promotion of economic activities that are compatible with these) and at achieving compatibility between the sustainable use of resources and ecological quality maintenance.

The transition zone consists of the remaining area of the island and a substantial area of its marine surroundings, for which there is a set of management and planning instruments to ensure sustainability of its resources.

8. BIOGEOGRAPHICAL REGION

From the Habitats Directive (92/43/EEC) and the implementation of Natura 2000 the European Union is divided into 9 biogeographical regions. As part of the Azores archipelago Flores Island is integrated in a region called Macaronesia, to which also belong the archipelagos of Madeira and the Canary Islands. This designation was proposed by the botanist Philip Barker Webb in the mid-nineteenth century based on the Greek name for "fortunate islands" given to the islands west of the Strait of Gibraltar by ancient geographers, and included also the archipelago of Cape Verde. This region was the first to submit a list of sites to be part of the European network of special protection sites (Natura 2000) with a large number of habitats of community interest listed in Appendix I of the directive.

The Macaronesian archipelagos share a common volcanic origin in the Tertiary period and subsequent effects of climate oscillations during the Quaternary period. Glaciations were softer in these islands than in the surrounding continental regions, which might explain the occurrence of elements that are regarded as biogeographic relics of the Tertiary. These include many families of tropical plants, and various species of the laurel and olive tree families (Lauraceae and Oleaceae). The isolation and geological history of Macaronesia contributed greatly to its interest in terms of biodiversity and a high number of endemic species: for example, 20% of plant species are endemics. However, the same factors that led to the evolution and persistence of these species, are now working against their conservation, which must be ensured. For this reason several Macaronesian endemic species were also included in Annex II of the Habitats Directive.

Macaronesian islands are spread across a large geographical area and have thus differing climate regimes. Madeira and the Canary Islands are subject to a Mediterranean climate with low precipitation and short temperature ranges. Their mountainous areas and wind regime (moist sea breezes near the coast and dry winds in altitude) create a layer of clouds at about 1000 m altitude that favor the establishment of important perennial native species communities. At higher altitudes frost and snow might also occur. The Azores archipelago, however, is subject to a strong Atlantic climate. High precipitation and humidity (especially at altitudes above 600m) increase significantly towards the western islands and there is little variation in temperature between summer and winter. The climate of the archipelago is intermediate between wet subtropical and Mediterranean climate regimes.

The Azores archipelago consists of nine inhabited islands, divided into three groups, spread across a northwest-southeast oriented stretch of about 600km between the latitudes of 36°55' and 39º43'N and the longitudes of 24°46' and 31º16'W. The shortest distance to the European coastline is 1,600km while the distance to Newfoundland is about 1,900km. The easternmost group of islands is composed by Santa Maria, São Miguel and the deserted reef Formigas. The central group is composed by Terceira, São Jorge, Graciosa, Pico and Faial. The westernmost group is composed by Flores and Corvo. The two most distant islands are Santa Maria and Corvo. The seismic activity and volcanism in these islands result from the interaction between a series of tectonic structures (**Figure 13**). The Mid Atlantic Ridge (MAR) is north-south oriented and consists of a purely distensive seismicaly active structure. The MAR is intersected and fragmented by east-west oriented transform faults and provides the boundary between the western American plate, the northeastern Eurasian plate and the southeastern African plate. The islands of Flores and Corvo, unlike the remaining ones, are sitting on the American plate to the west of the MAR and have low seismic activity and no historic volcanism.

9. LAND-USE HISTORY

Although the Azores were known already in the fourteenth century, no settlement is known to have existed prior to the fifteenth century. Flores Island, officially discovered in 1452 by Jorge de Teive and his son João de Teive, was firstly colonized between 1480 and 1490 without success. There were no indigenous people and colonization took place effectively in the beginning of the fifteenth century.

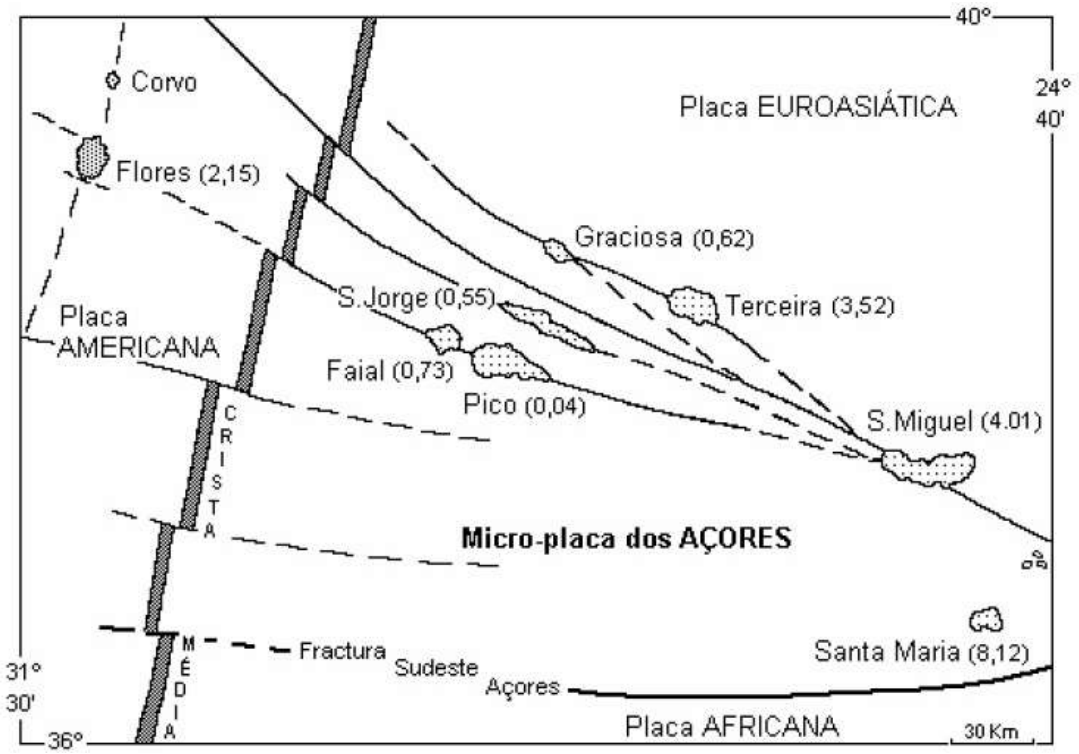


Figure 13. Geotectonical framework of the Azores archipelago. Source: Azevedo (1997).

It was originally called "Island of Corvimarini", later "Island of St. Thomas" and finally Flores Island, presumably due to the high abundance of yellow flowers (golden rod).

The settlement system of Flores Island is similar to that of other islands of this archipelago, characterized by a line of coastal populations. This comes from their volcanic genesis that creates mountainous masses of land with small coastal valleys and terraces. The lower relief near the coast and proximity to the sea have always been major factors in the establishment of populations. At the beginning of colonization in the fifteenth century, settlers with their families and related groups occupied the land they were given, and scattered along the coast in several clusters. The name of many "fajãs" and islets – such as the Fajãs of Lopo Vaz, Pedro Vieira and Valadões and the islets of Álvaro Rodrigues and Maria Vaz - perpetuate the name of some of the first settlers, thus supporting this theory. The isolation of these "fajãs", highly admired in the current days, strongly influenced the lives of settlers and imposed the need for hard survival strategies. Urban distribution was conditioned by the topography of the island and consequent difficult terrestrial communications, due to a coastline of high cliffs cut by deep valleys coming down the central plateau (**Figure 14**). Spatial discontinuity was the

main constraint of the island, which led to the development of good berth conditions in every village.

Figure 14. Coastal cliffs with a village installed in terraces.

Gaspar Frutuoso mentions only three parishes (Lajes, Santa Cruz and Ponta Delgada) at the end of the fifteenth century, but some families are reported to have been established in Cedros, "Fajãs" and Lajedo in the same period. This indicates the existence of small clusters scattered throughout the whole island alongside the main older settlements that gradually spread and gave rise to later parishes. The creation date of the first three parishes of the island (11 in total) is known to have happened in the sixteenth century. Lajes and Santa Cruz had the status of town already in 1514 and 1548 respectively, and Ponta Delgada had the status of parish at the end of the fifteenth century. Of the remaining, three became parish in the seventeenth century - Fajãzinha (1676), Cedros (1698) and Lomba (1698) - another four in the nineteenth century - Lajedo (1823), Caveira (1833), Mosteiro (1850) and Fajã Grande (1861) - and Fazenda only in the twentieth century (1959).

Currently, there are two main urban areas on this island, Santa Cruz das Flores and Ponta Delgada. Marine shelter justifies their location both on the east side of the island,

the latter in the southernmost tip of this side of the island. The two major exchange infrastructures of Flores Island are split between the two urban areas, namely the harbour at Ponta Delgada and the airport at Santa Cruz.

Domestic animals (pigs, goats, sheep and poultry) were introduced early in the colonization process of the island for food and to help clear the vegetation, leading to the exploitation of livestock (**Figure 15**), agriculture and natural forest timber, mainly of cedar (*Juniperus brevifolia*). Farming and agriculture spread throughout most of the usable surface of the island, as population increased and rents rose. This trend is still visible by the large number of terraces separated by basaltic stone walls, even on steep slopes, and has surely forced the reduction of forests.

Figure 15. Pasture with various breeds of cattle.

In the past inhabitants of Flores Island lived from wheat, sheep and the production of woolen cloths. Until the seventeenth century wheat dominated the agricultural landscape of Flores, when it began to be replaced by corn. Wheat was not only important in the Azores. The suitable soil and climate for its production allowed the supply of mainland Portugal and the Portuguese colonies in Africa. From the beginning of the twentieth century agricultural landscape suffered a major transformation with the shift from wheat to corn crops due to the import of cheap wheat flour.

Favourable conditions for pasture, especially above 300m altitudes, have always privileged cattle exploitation in the Azores. Pasture maintenance requires low workforce due to the humid climate, thus making the conversion of woodlands into pasture profitable. Sheep was the main livestock introduced in the Azores at the beginning of colonization, as it provided milk, wool and meat. Sheep were gradually replaced by cattle in Flores Island, after its cycle peaked in the eighteenth century. They were raised from birth until death in uncultivated fields (**Figure 16**). Various tissues and clothing replaced locally hand made blankets and other clothing from sheepwool due to the rise in mechanized textile industry in mainland Portugal and the rest of the world (but out of reach for the local population). Goats have always been used solely for subsistence purposes, and thus never outnumbered cattle and sheep. Livestock farming has influenced the landscape of Flores Island, with small cultivated pastures divided by basaltic rock walls in the lower areas and uncultivated ones in the higher regions, which are still visible today.

Figure 16. Pasture with sheep.

At the end of the nineteenth century emigration led to a drastic decline in population and the abandonment of farmland. Farming became restricted to domestic consumption and agricultural land was largely converted into pasture. Massive incentives were given to livestock exploitation in the second half of the twentieth century and a

large part of the land in the archipelago was turned into pasture, which reflects the economic importance of this activity in the Region (**Figure 17**).

Figure 17. Pasture landscape in multiple plots (Rocha order to Fajã Grande).

The mild climate of this island strongly favours the production of every plant that is common in temperate zones. Therefore, all essential goods are produced there, although not super-abundantly. Agriculture is characterized mainly by small varied cultures used for subsistence. Today, the main agricultural products of the island are based on corn (grain and forage) and potatoes.

At present, the surface of Flores Island is dominated by agricultural and natural landscapes: natural woodlands occupy nearly half of its surface (49.3%, representing 6,943 ha); and agricultural land (agricultural fields, pasture and uncultivated fields) occupies the other half (46.1%, representing 6,496 ha). Forestry occupies only 2.9% and urban areas 1.7% of the surface of the island, while industries and other land-uses (which include lakes) are negligible.

Despite the use of a large area of farmland, some major natural assets have remained untouched due to the inaccessibility and harsh nature of some areas of the island that are characterized by high altitudes and rough relief. Moreover, Flores Island

has a large surface area dedicated to nature conservation that consists of large core zones in the central area of the island that extend towards the coastline. In addition, other extensive complementary areas surround urban and major agricultural areas.

10. HUMAN POPULATION OF PROPOSED BIOSPHERE RESERVE

10.1. CORE AREA(S)

Without population.

10.2. BUFFER ZONE(S)

Estimated population of 15 inhabitants.

10.3. TRANSITION AREA(S)

Estimated population of 4,044 inhabitants.

10.4. DESCRIPTION OF LOCAL COMMUNITIES LIVING WITHIN OR NEAR THE PROPOSED BIOSPHERE RESERVE

Flores Island, like the other islands of the archipelago, was not inhabited at the time of its discovery by the Portuguese. Its current population stems from the settlement over the centuries and the coexistence of different ethnic groups. Wilhelm van der Haegen (a Flemish nobleman) made the first unsuccessful attempt to colonize this island in 1470. Effective colonization took place only in the sixteenth century under the guidance of the Portuguese Joao da Fonseca, with settlers coming mainly from Alentejo, Terceira and Madeira islands, some of which descending from French, German, Spanish and African. Additionally, over the centuries the population of Flores Island has been in contact with many other nationalities due to ship wrecks, piracy by English, Dutch and north African ships and the geographical strategic location of Flores Island of interest to many other nations and for different reasons.

Azores Islands played an important part in the Portuguese overseas activities, namely the conquer and defense of Portuguese colonies in North Africa, and acting as support for ships coming from and to India and America. The Azores resisted to the Spanish occupancy from 1580 to 1640, of which period remain some stone arch bridges

like those in Ribeira da Lapa (between Mosteiro and Lajedo), Ribeira of Ilhéus (near the mill ruins next to Ponta Delgada) and in Alagoa (**Figure 18**). Flores Island worked as first and last port for minor repair, water and food supply and recovery of crews. The islet of Monchique is the most westerly point of Europe, and was used as a benchmark to set the routes and calibrate navigation instruments (**Figure 19**). The number of shipwrecks that occurred off Flores Island is not surprising, since it stood in most shipping routes, which also provided the island with goods, knowledge and wealth. The archipelago's ports and airports provided a vital aid to the allied troops during the two World Wars, and worked as a major support center for communications. Around 1937 a German radiostation was installed in a department of the Lighthouse of Ponta Delgada on Flores Island. Later, in 1964, a French Meteorological Station was also installed on this island.

Figure 18. Former stony arch bridge built by the Spanish (Vila das Lajes).

Mainly due to emigration and also because of the ageing of the population in Flores Island, as in other islands of the Azores, there was a gradual decline in the number of inhabitants over the twentieth century (**Table 1**). Between 1900 and 2001 (Census 1900 and Census 2001) there was a decrease of over 50%, from 8,127 to 3,995 individuals.

This was largely due to strong emigration in the fifties to North America, Europe and the larger islands (S. Miguel and Terceira).

Figure 19. Islet of Monchique.

Table 1. Evolution of the resident population of Flores Island (1900-2001: censuses; 2006: estimate).

	1900	1911	1920	1930	1940	1950	1960	1970	1981	1991	2001	2006
Flores (Total)	8.127	7220	6.720	6.992	7.447	7.850	6.583	5.630	4.352	4.329	3.995	4.059
Lajes das Flores	4.498	3991	3.518	3.508	3.780	4.041	3.376	2.600	1.896	1.701	1.502	1.513
Santa Cruz das Flores	3.629	3229	3.202	3.484	3.667	3.809	3.207	3.030	2.456	2.628	2.493	2.546

The estimated population for Flores Island in 2006 was of 4,059 inhabitants, about 1.67% of the population of the Azores archipelago that indicates a reversal in the declining trend. Inhabitants are mainly distributed between the two municipalities of the island, Santa Cruz Flores with 63% of the population of the island (2,546 inhabitants, of which 1,269 are male) and population density of about 36 inhabitants/km^2, and Ponta Delgada with the remaining 37% of the population (1,513 inhabitants, of which 759 are male) and a population density of 22 inhabitants/km^2. There was a population growth

rate of 0.89% in 2006 maybe due to immigration, since the mortality rate was higher than the birth rate (12.9% versus 10.6%). In 2001 Santa Cruz das Flores had the highest number of inhabitants and Mosteiro the lowest.

The age structure of Flores Island in 2001 seems to reflect a decline in the reproduction rate in the last fifteen years illustrated by the decline in the number of individuals in the 14-19 years class. Decreasing number of individuals in the class above this one might be the reflex of migration for educational purposes. The majority of the population is 25 to 64 years old (2,201 individuals). Ageing, longevity and elderly people dependence indices (120.3, 48.2 and 25.8, respectively) are above both the regional average (64.4, 44 and 18, 2 respectively) and the national average (111.7, 44.9 and 25.6 respectively). In general it can be concluded that Flores Island has a young demographic structure, but an increasingly ageing trend (**Figure 20**).

Figure 20. Elderly people sitting next to the port of Lajes.

The illiteracy rate of the population of Flores Island was of 7.6% in 2001. Despite being lower than that of the archipelago and mainland Portugal (9.4% and 9% respectively), it worsened by 1% from 1991 to 2001 (6.4% in 1991), although of the generalized decline in Portugal. Overall, there is a low qualification of the population of Flores Island. About 80% of the population had attended school no further than the 2nd grade of basic school in 1991, of which 37% had no studies at all. In 2001, the

percentage of people with studies below 2nd grade of basic school fell below 60% in the Region, and in Flores the drop was of ca. 15%. The percentage of people with full secondary education or higher increased throughout the archipelago, and Flores Island was no exception with an increase of 5%.

The majority of the active population of Flores Island is employed in the tertiary sector (61%), mainly in social services (61%) and less in economic services (39%). Of the remaining active population, 24% is dedicated to the secondary sector (mainly in the dairy industry, **Figure 21**) and 16% dedicated to the primary sector.

The number of firms with headquarters on this island has increased in recent years, and in 2004 about 2% of all firms operating in the Azores had its headquarters in Flores Island.

10.5. NAME(S) OF NEAREST MAJOR TOWN(S)

The city of Horta, located in Faial, is at a distance of 242km from Santa Cruz das Flores and is reachable only by sea or air. Its population is of 6,400 inhabitants (2001).

Figure 21. Dairy factory.

10.6. CULTURAL SIGNIFICANCE

A crucial factor in the history of Flores Island is its isolation from the remaining islands of the archipelago. It led to the failure in the first colonization attempt and thus the long gap between its discovery and the first settlement. Wilhelm van der Haegen (Guilherme da Silveira), a Flemish nobleman, unsuccessfully attempted in 1470 to settle in the valley of Ribeira da Cruz, where he firstly attempted to cultivate a blue plant called "pastel". He ended up moving to São Jorge, possibly because of the isolation of Flores Island, its stormy weather and the lack of regular boat connections to export of "pastel" that mined his expected earnings. The final settlement took place in the sixteenth century with the Portuguese Joao da Fonseca (a native of Evora, to whom the Flemish had sold the possession of the island in 1504, and later passed on to his son Pêro da Fonseca). The new colonizers came mainly from Alentejo (on mainland Portugal), Terceira and Madeira Islands, and settled down along the coast of the island.

Once populated, the contact with the rest of the world happened only during Royal visits, through vessels that stopped for water and food supply and through commercial relations with boats from Terceira and Faial (only between March and September). A monthly boat connection was established in 1861 between the islands of Flores and Faial in order to overcome commercial difficulties. These, however, remained irregular and it was only in 1875 that the "Atlantic" (a merchant ship from the Insulana Navigation Company) reached Flores Island. There were several frustrated attempts to build an artificial harbour with capacity for several vessels. The actual harbour of Lajes was concluded only in 1994, after long years of indecision and controversy.

Because of their geographical position, Flores and Corvo Islands were in the way of plenty commercially important Atlantic routes for several centuries, namely to and from India, Mina, the United States and Guinea. For this reason pirates waited in the vicinity of these two islands for the wealth that these ships transported to Europe. There is a famous example of piracy in Flores Islands conducted by five British pirate ships in 1587, that robbed and destroyed everything and burned down all religious temples. Also worth noticing is the assault carried out by English ships to Spanish ones coming from India, which confrontation became known as the "battle of Flores Island". After the English and French pirates came the Algerian and Dutch in the sixteenth century, and then Mexican and American ones.

The traditionally stormy sea around Flores Island led to many shipwrecks and the local population usually got involved in the rescue and hosting of its survivors. It is still possible today to find various objects and pinewood collected from shipwrecks in the

homes of Flores. The sinking of the Norwegian ferry "Brilliant", in Quebrada Nova in 1899, when carrying a large load of pinewood from the United States to Europe was even considered a miracle, since it allowed the quick conclusion of the church of Fazenda das Lajes.

The rugged topography of the island was also a major obstacle to the development of communications in Flores, since it posed difficulty to move around either by horse, donkey or on foot, especially considering that many locals did not wear shoes (still 70% of the population in 1950). Road construction started only in 1857 and by the end of the nineteenth century had reached only about ten kilometers and still most rural parishes were only accessible by sea or by dirt roads cut by waterstreams. The construction of an efficient road network began only in 1946, and has been improved ever since.

Emigration started gaining importance given the isolation of the island and its political and economical unfavourable conditions for the lower classes. Until the nineteenth century Brazil was the preferred destination because of attractive recruiting campaigns. Many ended up being sold as slaves, since there were no legal regulations of emigration at the time. From the nineteenth century on emigration shifted mainly to the United States of America (USA), especially the state of California because of the gold race around 1849. At that time most emmigrants were unmarried men who sought quick fortune while fleeing from obligatory military service. To reach the U.S. many of them enlisted in the crews of American whaling boats that were hunting sperm whales in the Azores since the mid eighteenth century. A new type o emigration was born - illegal and difficult to quantify. Many of these emigrants deserted immediately from the ship crews, while others paid the freight to America through their share in the harvest which could take up to two years. However, the bulk emigration to the United States took place in the last quarter of the nineteenth century in response to the negligent Portuguese Crown that only collected taxes without investing in Flores Island. The means of transport for illegal emigration extended beyond the whaling fleet to a large variety of domestic and foreign commercial and passengers vessels. Illegal emigration gained such proportion that armed patrols were required in Santa Cruz, Lajes, Ponta Delgada and Fajã Grande to shoot those who tried to board illegally. Emigration destination diversified to Hawaii, Australia, New Zealand, Bermuda and Canada. In the second half of the twentieth century, between the 60s and 80s, emigration concentrated exclusively in the U.S. and Canada following the establishment of immigration quotas for the Azores in those two countries. Portugal, then ruled by Salazar, was going through a weak economic development period which led many Civil Governors to seek for high emigration shares to solve the unemployment problem in their regions. Emigration is no longer significant

either in Flores Island or in the Azores in general. The link between Flores and the U.S., however, remains strong because of family ties, and regular visits of emigrants that keep their summer houses in Flores Island. On the other hand, the effects of emigration are still visible in the weak social-economic reality of the island – a reduced and aged population, left behing by the younger, stronger and adventurous workers that went to look for a better future.

Although there have long been surgeons on the island an effective medical care service was established only in 1878 with the construction of Hospital da Misericórdia de Santa Cruz.

Despite the abundance of water on Flores Island municipal budget problems prevented the development of a proper piping system to overcome common water shortages that the population was subject to until the second half of the twentieth century.

Flores remained poorly developed until the flourishing of the whaling industry in the twentieth century. This activity was brought from the U.S. during the nineteenth century and kept its traditional techniques until 1981, when the last whale was killed by Government decree and for respect to the worldwide movement for the protection of marine mammals. Whaling was usually a secondary activity. Whalers left their main professions at the sound of the alarm indicating the sighting of a whale, gathered in the harbours and left in boats to catch spermwhales with harpoons. In the beginning of the 1950s spermwhale fat was melted and amber extracted in factories (**Figure 22**). After 1944 whale meat and bones were dried and ground in the new factory of Santa Cruz for the production of flour used in animal feed and land fertilizer. The ivory teeth of whales also became of high commercial value at this time. The pact that resulted in the Union of Whaling Boats of Flores and Corvo (União das Armações Baleeiras das Flores e Corvo Lda.) regulated this activity in the western group from 1955 to 1981 and marked the the peak of this activity in Flores Island.

Jacob Tomás, was born in Flores and died in California in 1999, owned the largest private scrimshaw collection, which can be seen today at the Whalers Museum in Lajes do Pico. The buildings associated with this activity, namely those in the harbours of Lajes and Boqueirão in Santa Cruz, are currently being restored to be used as museums/interpretation centers. These are intented to enhance the environmental and cultural knowledge of the island and improve the quality of tourism.

Despite having improved the economy of Flores Island for a short period of time, whaling activity did not benefit directly the majority of the population, and hence emigration remained constant. Greater progress on Flores Island was noticed only in the

mid-twentieth century. The phone was installed in 1925 linking only the post offices of the two towns between 9am and the 6pm, while rural parishes only benefited from this service after 1956. The telephone network of Santa Cruz started in September 13, 1952 and the telephone connection between the islands of Flores and Faial in February 1968. The automation of the telephone networks of Flores Island started in September 18, 1974 after the inauguration of the Automatic Telephone Central of Santa Cruz.

Figure 22. Former factory of whale in Lajes.

It was also in the nineteenfifties that preparatory school was established in Flores Island (although examinations remained in Horta). Until then, public school was limited to primary education and only children of wealthy families could continue their studies in other islands for secondary school (Ponta Delgada, Angra do Heroismo or Horta) and the mainland for higher education (Lisbon, Porto and Coimbra). In the nineteenseventies education in Flores Island was extended to the secondary level (**Figure 23**).

The Agricultural Station of Flores Island was created in 1950 with great importance to the local agricultural and livestock activities, providing employment and support for local farmers.

The Naval Radio Station of Flores Island, that had operated in a department of the town's lighthouse since 1938, was inaugurated in Lajes in 1951 by the Navy Ministry. These facilities were intended to support the Portuguese war navy and contributed

greatly to the social and economic development of the island, since it involved the relocation of many workers and frequent visits of Portuguese navy vessels. The station comprised technical and housing facilities for its staff and their families, with enough space for 50 people. It was extinguished in the early nineties and the premises and land were acquired by the municipality of Ponta Delgada.

Figure 23. Integrated Primary School in Santa Cruz.

In 1964 the Portuguese and French Governments agreed on the creation of the Meteorological Station of the French Armed Forces on Flores Island. This agreement was crucial for the island, since it gave way to the construction of the airport (1964-68), the complete electrification of the island (through the construction of a dam in Ribeira de Além in Fazenda, the hydroelectric central and its distribution network throughout the island), and the construction of a road between Cedros and Ponta Delgada (where the Meteorological Station had been installed). The airport, however, only became accessible for the local population with regular flights between Flores and Faial, after the revolution of April 1974, following the nationalization of SATA and the institution of the autonomy in the Azores. Until then, it was used only by French and Portuguese military aircrafts while the transport of passengers, goods and correspondence was made solely by boat, on a monthly basis since 1930, and fortnightly after 1955. Electricity already existed on the island since the 1940s, but was available only in the two towns from sunset until 10 or

11pm. Also as a result of the Portuguese-French agreement a house complex, a hotel (Hotel Servi-Flor) and a gym were built in Santa Cruz for the French, and the harbour Porto Velho was repaired. The employment that this station provided for local people was also of significant importance for the island's economy, as was the revitalisation of trade, the military and political support, and later (after the institution of the autonomy in the Azores in 1976) the financial support. Technological development and global disarmament after the fall of the USSR led to the deactivation of the French Station in 1992. It has been converted to host the headquarters of the police and fire brigade, a leisure space for children and for tourist accommodation.

Around 1990 television reaches the whole island through the inter-island airwaves beam (Faial-Flores). In November 1999 a satellite receiving and transmitting station in Flores Island started broadcasting to Corvo Island.

The long years of poverty in Flores Island are patent in many small centennial houses of exposed volcanic rock, many of them restored and inhabited or used as haystacks in the present. These houses contrast with the whitewashed ones that exhibit colorfull linings of doors and windows (**Figure 24**). Whitewashing is a traditionally expensive technique made cheaper and more accessible due to the improvements in transports and more competitive markets.

Figure 24. Exposed and whitewashed basaltic rock house.

The two main types of rural housing are the linear type and the dissociated kitchen type, and are probably based in pre-nineteenth century houses. They present similarities to those of Faial Island, thus reflecting the historic relation between these two islands.

The linear house type is the most common one, and is always of a simple rectangular shape with two doors (from the kitchen and from the rooms) opening to one single façade. It doesn't have a fixed relationship with the street (can be perpendicular sometimes when facing the sea or on a slope) and can be shorter or more elongated, with a single floor, or with one storage ground floor. The most common and traditional version presents its back towards the road, with a small front balcony and sometimes a small toilet house sitting on top of the pigsty. Rural households usually consist of a traditionally linear main house (with multiple variants), a corn dryer and a haystack for storing utensils and agricultural products (**Figure 25**). The distribution of rural households is highly dispersed and isolated from the streets.

Figure 25. Corn dryer.

The "half-roofed" house is frequent around Lajes. It is a variant of the single floor linear type with its housing space duplicated by the extension of one of the sides of its roof along its entire length. The L-type house is another variant of the linear type that seeks to duplicate its interior space by articulating two perpendicular identical bodies

(each with its window-door-window façade) with the kitchen at one of the tops. The two floored linear house type is usually an adaptation to a natural depression in the topography of the ground and deploy a partial ground floor below the linear type first floor. Two independent entrances, to the kitchen and the bedrooms, are kept in this type of house.

The dissociated kitchen type house can also have one or two floors. It is characterized by having a window-door-window (or two doors and one window) façade, and a separate body in the back for the kitchen (perpendicular to the main house) with its door facing the interior of the angle formed by the two bodies. Its toilet/pigsty can be attached to the kitchen and share its roof for waste reutilization. This type of house is very common in Mosteiro and when having two floors the ground floor usually has a stone arch door to facilitate the access of the ox-wagon (**Figure 26**).

Figure 26. Typical house of Mosteiro with its stone arch door in the ground floor.

The complex and larger houses are also widespread throughout Flores Island and always have two stories (the ground floor for storage and the top floor for the kitchen and bedrooms), usually with an L-shaped plant. There are not many houses of noble influence and the existing ones occur naturally in the most important places of the island: in the two towns (Santa Cruz and Lajes), Ponta Delgada and Fajã Grande. They usually have proeminent basis and carved stone outlinings, elements that are common in

buildings from the second half of the eighteenth century, also on other islands like São Miguel.

Furnaces and chimneys represent self-sufficiency of families, and constitute also an architectural mark in Flores Island. Basic needs were always assured by agricultural and livestock production, and also home production of bread, cheese, butter, sausagees, and other. The use of wood-fired ovens for baking is still patent in current habits of the population. Unlike in the remaining islands, chimneys in Flores are of varied types and sizes, depending if they belong to the furnace or to the fireplace, or both (**Figure 27**).

Figure 27. Details of a traditional chimney.

Cereal production was one of the most important of Flores Island for many years, although today it is restricted almost exclusively to small quantities of corn. As a result, there are several infrastructures that were used to support rural activity related to the (1) treatment, (2) storage, and (3) milling cereals:

1) Dryers are still in use for corn and its most common model is rectangular, sitting on large pillars of whitewashed rock.

2) Haystacks, originally built with basaltic rock and covered with straw are now covered with tile. Similar to those found in Faial they can be found throughout the island, and vary in structure (with one or two floors).

3) Watermills, with horizontal or vertical millstone, are usually along water streams as a way to exploit the numerous springs and waterways (**Figure 28**). Currently there is only one watermill in operation (though not full time) in Ribeira da Alagoa, near Ribeira Grande on the way to Fajã Grande. Many others are abandoned, witnessing the price of progress and their ruins evoking centuries of hard labor. The milling system is the usual one and consists of two stones to grind the corn that falls through a funnel from a wooden container. The dike and dam, in the water stream behind the mill, allow the stopping of the grinding wheels. Their rotation is powered by water in the basement of the mill.

Figure 28. Watermill along the river bank.

"Impérios" (=empires) are very similar to the linear type houses (**Figure 29**). They can be distinguished by a painted Holy Spirit crown in bas-relief in the center of its façade, and are where the celebrations of the Holy Spirit are held (**Figure 30**). Its interior includes the altar and attached to it a storage room where the meat is prepared for the festivities.

Figure 29. Typical Holy Spirit "Império".

Figure 30. Details of the crown of the Holy Spirit in bas-relief in the façade.

The celebrations of the Holy Spirit brought by the first settlers is currently one of the most important social and cultural events in Flores Island. There are several "Impérios" (sometimes more than one in each parish) and festivities happen in their surroundings (**Figure 31**). On Flores Island these celebrations take place between the Easter Sunday and Whitsunday, during a total of seven to eight weeks. On Easter evening the so-called "mordomo" collects the crown and the flag of the Holy Spirit from the "Império" house accompanied by musicians wearing traditional costumes and singing traditional songs. Cattle are raised on purpose to be slaughtered and its meat distributed among the brotherhood of the Holy Spirit (those who contribute finantially). Meat distribution happens on a Friday in the presence of the Holy Spirit crown and flag. Traditionally (still in the 1960s), the distribution was made door to door in decorated cars pulled by oxes. In the evenings of Friday, Saturday and Sunday there is music and dancing. Until about 1930 dancing took place inside the "Império" houses, but the church eventually banned this practice. Lunch is distributed to all the population for free on Sunday, and consists of boiled meat and bread soup and cooked roast beef with sweet bread ("massa sovada"). Red wine and more recently soft drinks are also available.

Figure 31. Procession of the Holy Spirit with crown and flag.

The Holy Spirit festivities held in August in Santa Cruz, with 27 crowns from all "Impérios" of the island, are considered the largest festivities dedicated the the Holy Spirit in the Azores.

Between May and September there are other festivities in Flores Island, namely popular festivals and celebrations of the patron saints of each locality with processions and folk music (**Figure 32**). Among the most popular festivals are the Sanjoaninas in Santa Cruz, and the Emigrant festival in Ponta Delgada, which attract many emigrants and outsiders from other islands and from all over the world.

Figure 32. Philharmonic playing in a popular festival.

Pork slaughter is another tradition of centuries, still common in rural parishes, and has an important social component, although its main role is to ensure the basic nutrition of families for the whole year. It's viewed as a celebration where family and friends share tasks and meals while it lasts, and dancing and singing is not uncommonn.

The current recreational activities and facilities include the theatre, the philharmonic, clubs, community centres, parish centres and the local newspapers ("As Flores" and "O Monchique").

Churches and chapels are the main monuments in Flores Island. Isolated and threatened by storms, the people of these islands looked for spiritual peace in Christian devotion. Gaspar Frutuoso refers to the existence of five chapels in the sixteenth century: Santa Catarina, S. Sebastião, Santa Ana and two dedicated to S. Pedro. More recently the church of S. Cruz was built and dedicated to "Nossa Senhora da Conceição". However, all these monuments were robbed and destroyed by British pirates in 1587. Nevertheless, these were promptly rebuilt in straw which reflects the strong devotion of the people from Flores Island.

Figure 33. Church of Nossa Senhora da Conceição in Santa Cruz.

Currently, parish churches (excluding the one annexed to the Hospital of Santa Cruz, a former convent of the Order of St. Francis) are located throughout the island. Among the most beautiful and artistically most valuable, is the church of "Nossa Senhora da Conceição" (Main church of Santa Cruz, **Figure 33**), the church of "São Pedro" (Ponta Delgada), the church of "Nossa Senhora do Rosário" (Lajes), the church of "São Boaventura" (commonly referred to as S. Francisco in Santa Cruz), the church of "Senhor Santo Cristo" (Fazenda das Lajes), the church of "Nossa Senhora dos Remédios" (Fajãzinha, **Figure 34**) and the church of "Nossa Senhora dos Milagres" (Lajedo).

Besides general fish and meat recipes that are present throughout archipelago, Flores Island offers a variety of exclusive dishes such as watercress soup, pig stew, yam with sausage, beans with pork head, seagrass pasties and brick cake, among others.

The isolation in Flores Island led to the development of special techniques that gave rise to characteristic crafts, namely carvings in whale bone and teeth (**Figure 35**), wood works, cornsheet dolls, hydrangea kernel flowers, osier, embroideries and patchwork.

Woolen and flax panels from Flores Island are described in the nineteenth century as the best of the Azores and its weavers known for the fineness of their work. Woolen pannels were used for clothing (natural or dyed through traditional processes), blankets and bedspreads. Linen was generally presented in natural colors, sometimes with colorfull decorations. Collective sheep farms in uncultivated pastures were crucial for the production of wool. Marking and shearing the sheep were collective activities coordinated by a "judge" designated by the President of the Council. Sheepshearing day, also called "day of the wire" was a celebration. Men and women from various localities spent the day in the field. After an intensive work to prepare the wool (washing, combing, spinning and kneading) women wove blankets, coats, underwear and shirts and knit sweaters, jackets, dresses, skirts, stockings, and many other items.

With increased emigration to the United States the production of fabric fell gradually throughout the island, although there was still some weaving at the beginning of the twentieth century. The progress of the mechanized textile industry also brought to Flores Island various tissues and clothing that replaced manually woven blankets and clothing from sheep wool. Looms are actually rare and used primarily for decoration. Crafts were outcompeted in price by industrial products.

Life in Flores Island improved greatly in recent decades, partly because of the commitment of both municipalities (Santa Cruz das Flores and Ponta Delgada) and above all due to the incentives to public investment provided by the European Union. Nevertheless, Flores Island still has shortcomings regarding social and cultural infrastructure and collective equipment that are fundamental to attract and settle the population. Its low population, however, does not favour profitable investment in such infrastructure and equipment.

The cultural identity in Flores Island continues strong, although of the increasing influende from the outside world (either physically or through information and communication technologies).

Despite an ageing population and its declining trend in the last century, recent projections indicate an weak increase in population, though not entirely endogenous. The only way to ensure the preservation of such an identity is by improving the living conditions of the population, while preserving the natural and cultural features through initiatives such as the creation of a Biosphere Reserve in this place.

Figure 34. Inside of the church of Fajãzinha.

Figure 35. Whale bone crafy of the ethnographic museum.

11. PHYSICAL CHARACTERISTICS

11.1. GENERAL DESCRIPTION OF SITE CHARACTERISTICS AND TOPOGRAPHY OF AREA

Flores Island is characterized by two main areas: the central plateau and the peripheral edge. The central plateau is a two step structure. A northern part averages 600-700 meters in height and reaches its maximum elevation of 914m in Morro Alto and a lower southern one of 500 to 600 meters, presents smaller and more modest volcanic features. In the flat surrounding areas of these cones, ancient sunken craters accumulated water and became lakes of variable depth. Humid habitats give rise to a landscape dominated by various shades of green.

Figure 36. Peat bog of altitude.

The weather and peat bogs of high altitude (the largest of the Azores, **Figure 36**) combine to provide efficient water retention that feeds aquifers that are crucial for the rich hydrogeological system of the island. High precipitation is channeled to the lakes that act as water reservoirs and flow stabilizers. Permanent or temporary streams are an important feature of the landscape, flowing from their sources in the higher central regions along grooves and valleys towards interior and coastal cliffs. The valleys of

Ribeira do Moinho, Ribeira Funda da Ponta Ruiva, Ribeira do Cascalho, Ribeira da Badanela, Ribeira Funda da Lomba and Ribeira das Casas are worth highlighting, because of their size and carved depths in the central plateau.

The peripheral edge is morphologically diverse due to the combined action of various erosion processes, types of rock and geotectonic structures. Approximately 5000 years of volcanic dormancy have allowed the sea to erode the coast leaving out small tips and islets. Cliffs higher than 500m (**Figure 37**) give birth to "fajãs" through the agglomeration of boulders and cobbles that are decorated with scenic waterfalls, two of the ex-libris of the island. The platform of Fajã Grande and Fajãzinha and the valley of Ribeira da Cruz are examples of fossil cliffs that were formed also by marine erosion when the sea level was higher.

The broad ESE-WNW oriented valley of Lajes also called "whale's mouth" is another important topographical feature of Flores Island.

11.1.1. Highest elevation above sea level

The highest elevation above sea level is 914 meters.

11.1.2. Lowest elevation above sea level

The lowest elevation above sea level is 0 meters.

11.1.3. For coastal/marine areas, maximum depth below mean sea level

The maximum depth below sea level within the area is 1,000 meters.

11.2. CLIMATE

The general weather conditions of the Azores archipelago arise from its unique geographical location in the North Atlantic, where two global factors interact: the ocean and the Gulf current. The ocean acts as a heat reservoir that produces large masses of humid air, while the Gulf current prevents cold superficial waters from the north-northeast to reach the achipelago. Local factors such as relief, soils and vegetation influence the climate at a smaller scale. The result is a temperate marine climate, with alternating cold and wet periods and moderately dry and warm ones. On most islands the climate is humid to super-humid, rainier than in the surrounding ocean, and mesothermic with low daily and annual temperatures ranges.

Figure 37. Coastal cliffs.

Flores is probably the rainiest island with the highest temperature range of the archipelago due to its proximity to the warm Gulf current. The average annual temperature in Flores Island is 17ºC, with a maximum monthly average in August (22ºC) and minimum in February (13ºC). The average monthly relative air humidity is about 79-81% throughout the year. Windspeed in Flores is similar to the other islands and these prevail from North and South with equivalent strength. On average there are 54 days per year with winds stronger than 36km/h and 6 days per year with winds exceeding 55km/h.

11.2.1. Average temperature of the warmest month

The average temperature of the warmest month (August) is 22ºC.

11.2.2. Average temperature of the coldest month

The average temperature of the coldest month (February) is 13.2°C.

11.2.3. Mean annual precipitation

The average annual precipitation is 1,716 mm.

11.2.4. If a meteorological station is in or near the proposed Biosphere Reserve, indicate the year since when climatic data have been recorded

a) Manually: Manual records of temperature began in 1897.

b) Automatically: Automatic records of temperature began in 1996/97.

c) Name and location of station: Centro Meteorológico de Aeronáutica das Flores, Airport of Santa Cruz das Flores.

11.3. GEOLOGY, GEOMORPHOLOGY, SOILS

1. Volcanic-tectonic and geocronological framework

Unlike the remaining islands of the archipelago Flores and Corvo, that form the western group, sit on the American tectonic plate to the west of the Mid Atlantic Ridge (MAR).

Based on current knowledge on the geology and volcanism/tectonics of Flores and Corvo Islands it is possible to say that: i) both islands represent and emersed component of a large submerged 9.0-10.0 million years old volcanic complex; and ii) its genesis is clearly a result of the interaction of the MAR with the smaller regional transform faults, although the effect of the latter is less evident than in other Azores islands. The main structural alignments of Flores Islands are as follows: (1) left spreading faults N30-40ºW and normal faults N20-30°E; and (2) less expressive NS alignments. There were major vertical tectonic movements during the genesis of this volcanic complex. Radiometric evidence on the existing volcanic formations in Flores Island indicates that their geological age is between 0,003 and 2,2 million years old. This makes Flores Island the fifth oldest of the archipelago (after Santa Maria, Sao Miguel, Terceira and Graciosa) and indicates that volcanic activity in these islands extended to the current geological age.

2. Volcanic-tectonic and stratigraphic evolution

The geological complex where Flores Island is located resulted from a sequence of tectonic and volcanic episodes of variable intensity, duration, and productivity that alternated with quiescent periods. This process can be divided into two phases: proto-island phase (submerged and emerging); and island phase (subaérea).

2.1. Proto-island phase

Volcanic Base Complex is the name given to the produce of the latest submerged and emerging volcanic activity that can be found today in the emersed areas of Flores Island. It indicates that this island was formed out of alternating explosive and effusive submerged volcanism. However, disperse predominantly pyroclastic rock deposits indicate that explosive activity predominated. During the terminal period of this phase there was strong explosive emerging volcanism that produced palagonite rich pyroclastic deposits. The lack of records from the proto-island phase does not allow a clear understanding of the tectonic evolution during this period. However, the intense explosive volcanism of its terminal period and the quick transition from submerged/emerging volcanism to surface volcanism, suggest positive vertical tectonic movements.

The proto-island phase is supposed to have started later than 9.0 million years ago (since this is the age of the local oceanic crust) and ended 0.75 million years ago.

2.2. Island phase

Upper Volcanic Complex is the name given to rocks and volcanic structures formed during this phase. Its characteristics, geological history and stratigraphy indicate that Flores Island was built from three periods of extrusive volcanic activity (CS1, CS2 and CS3) separated by two dormant phases. The extrusive periods differed much in terms of volcanic processes and magma characteristics as evidenced by chemistry, rocks, texture and structure of its records. Period CS1 started around 0.7 million years ago and lasted until 0.55 million years ago, and presented an evolution in the type of volcanism, number of active spots and nature of extruded lava. The earliest records consist of wide areas of thick basaltic, Hawaiian and mugearitic lavas poor in pyroclasts, while the latest consist of narrow areas, dikes and needles of benmoreitic and traquitic rock. CS2 period, between 0.4 and 0.2 million years ago, consisted of strombolian and Hawaiian volcanism in a small number of monogenetic stratovolcanoes that originated narrow areas of basaltic and havaitic lavas alternating with pyroclastic layers. The last volcanic period

(CS3), between 0,004 and 0,003 million years ago, started with strombolian and Hawaiian activity that originated some 30 pyroclastic cones of various sizes and two tuff-ring cones. The last highly explosive hydrovolcanic eruptions resulted into four craters and a vast area covered in volcanic ash and rock fragments.

The tectonic evolution during the island phase is complex. Initially, positive vertical movements that marked the transition between proto- and island phases contradicted the progressive subsidence of the oceanic crust, as evidenced by records of submerged and emerging volcanism at depths below 350m. In the subsequent period vulcanic-tectonic trend reverts to the subsidence of broad areas of the island, particularly in its central part, thus forming large craters and the valleys of Fazenda das Lajes and Santa Cruz and interlocking basalt columns in the NE coast of Flores Island.

Since the end of the CS2 period (0.2 million years ago) the island shall have subsided continuously, thus following the whole oceanic crust.

3. Geomorphological evolution

The evolution of Flores Island in the Quaternary period can be divided into four main stages (**Figure 38**).

Stage 1: rising and lateral and vertical growths - it resulted from the regression of the sea water level and the rise of tectonic plates during the transition from the proto-island phase to the island phase, lasting until about 0.55 million years ago. At the end of this stage the island reached its largest maximum and minimum diameters and maximum height (1000m) gently sloping down towards sea level.

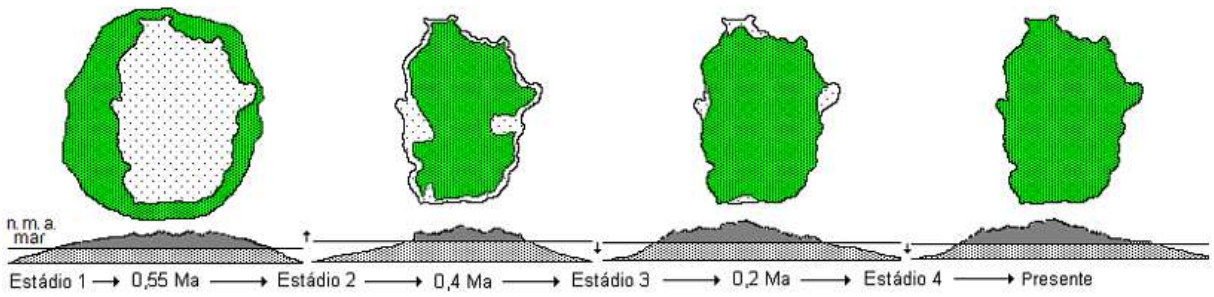


Figure 38. Schematic representation of the geomorphological Quaternary evolution of Flores Island (adapted from Azevedo et al., 1998).

Stage 2: implementation of old destructive morphologies - it occurred during a period of volcanic quiescence, between 0.55 and 0.4 million years ago. The main volcanic complexes from the CS1 period collapsed leading to partial and/or generalized subsidence processes. After Stage 1 a sharp rise in sea level resulted in the smallest minimum diameter and lowest volume of all times in Flores Island, with large bays and

inlets (Fajã Grand Fajãzinha, Ribeira da Cruz and Costa do Lagedo) associated to steep coastal cliffs.

Stage 3: vertical growth – 0.4 to 0.2 million years ago the subsidence trend reverted and the some sectors of the island rose. Stacking of vulcanos from the CS2 period led to the increase in the island's maximum quota, with a volume and surface area close to the present one.

Stage 4: Implementation of recent hydrovolcanic and erosive morphologies – this stage took place from 0.2 million years ago until the present, after a long interruption in volcanic activity (from 0.2 to 0,003 milion years ago). The last eruptions (hydrovolcanism of the CS3 period) occurred then and caused deep changes in the morphology of the central areas of the island, giving rise to numerous slag cones and explosive craters. Some of the latter are currently transformed into scenic lakes.

4. Volcanic-tectonic and erosive morphologies

The actual morphometric characteristics of Flores Island are the result from the interaction of constructive processes (volcanic activity, positive tectonic movements and regression of sea level) and destructive processes (erosive action of watercourses, marine abrasion, subsidence movements, explosive volcanism, seismic activity and sea level rise). Constructive morphologies dominate over destructive ones on this geologically young island. Extinct or dormant volcanic activity, however, currently sets the dominance of erosive processes.

Geomorphologically Flores Island is divided into two main sectors: the central plateau; and the coastal fringe.

Primary volcanic morphologies dominate the central plateau: flat large areas associated with the collapse of volcanic cones from the CS1 period; volcanic cones from the CS2 period (such as Morro Alto); slag cones from the last volcanic stage (such as Marcela, Sete Pés and Lomba da Vaca); tuff-ring volcanic cones (such as caldeiras da Lomba and Rasa); and explosive craters (such as Caldeira Negra, Comprida, Seca and Funda).

Erosive morphologies dominate in the borders of the central plateau and on the coastline: valleys that resulted from the erosion of water streams (such as Ribeira do Moinho, das Lajes, da Fazenda and Funda); cliffs that resulted from coastal landslides and wind erosion (such as the segment of Fajãzinha-Ponta da Fajã and Costa do Lajedo); major platforms that resulted from marine abrasion (such as the segment Fajãzinha-Fajã Grande, Ponta do Albarnaz, Ponta Delgada, Ribeira da Cruz and Costa do Lajedo); and platforms associated with coastal landslides and collapses (such as Fajã do Conde , de

Lopo Vaz and Ponta da Fajã). Though its small size, Flores Island has great variety of primary and secondary highly scenic geomorphological features with high potential for volcanological and geomorphological studies.

12. BIOLOGICAL CHARACTERISTICS

12.1. HIGH AND HUMID AREAS (REGIONAL)

12.1.1. Characteristic species

The northern area is characterized by cedar shrubs (*Juniperus brevifolia*) and hays (*Deschampsia foliosa*), while peat bogs prevail in the northwestern and northeastern areas. The central part of the island is composed of peat bogs with cedar woodlands (**Figure 39**) and vast wetlands where large lakes are concentrated, used by migrating freshwater birds. The lower southern part of the island is more habitat diverse but also more affected by human activity. Several types of wetlands and shrub woodlands occur in these areas, where the pigeon *Columba palumbus azorica* (an endemic sub-species to the Azores) can be found, representing 2 to 15% of its actual population. Endangered plant species, considered to be near to extinction can also be found in the southern wetlands and shrub woodlands. The most relevant species of the flora of the small lakes and rivers are *Juncus* effuses and *Scrophularia* sp. The less deep zones of the water masses are covered by macrophytes as *Potamogeton polygonifolius*, *Fontinalis antipyretica* or *Rhyncostegium riparioides*.

The endemic areas of vegetation host a micro-fauna of invertebrates important not only in terms of their ecological role, but also as indicators of evolutionary processes in action in these islands. Among the eleven endemic species of mollusks found in Flores, for example, two gastropods are endemic to this island and Corvo. Already in arthropods can be found 10 exclusively on Flores between 101 species and sub-species endemic to the Azores registered in that island. These can add up a leafhopper-of-trees and a butterfly known only from the islands of the Western Group.

The **Table 2** summarizes the species most characteristic of wetlands.

Figure 39. Cedar woodlands and peat bogs.

12.1.2. Important natural processes

In Flores Island there are 15 habitats listed in the Annexes of the Habitats Directive, some of them priority ones:

- Macaronesian endemic heaths;
- Raised active peat bogs;
- Raised active degraded peat bogs with possible regeneration;
- Peat bog woodland;
- Azores laurissilva woodlands.

This is the largest wetland complex of the Azores, where the combination of topography, abundant and continuous water flow and impermeable iron-magnesium rich soils provide perfect conditions for peat bog coverage. It is a central element in the water regime of the island of Flores, to attract and retain the precipitation visible and hidden, redirecting it to the island's natural system of lakes and aquifers and contributing to the micro-climate characteristic of comparatively high precipitation and relative humidity of the air. The vast area of natural vegetation consists of bogs and wet meadows, and also

decreases the action of erosive processes, contributing to the establishment of nutrients and consequent production of fertile soils.

Table 2. Species most characteristic of wetlands.

Group	Cedar Woodlands e Peat Bogs	Waterstreams and lagoons
Plants	*Ammi trifoliatum* *Azorina vidalii* *Chaerophyllum azoricum* *Culcita macrocarpa* *Deschampsia foliosa* *Erica scoparia azorica* *Euphorbia stygiana* *Euphrasia azorica* *Frangula azorica* *Isoëtes azorica* *Juniperus brevifolia* *Picconia azorica* *Rumex azoricus* *Scabiosa nitens* *Trichomanes speciosum* *Woodwardia radicans*	*Potamogeton polygonifolius* *Fontinalis antipyretica* *Rhyncostegium riparioides* *Juncus effusus* *Scrophularia* spp.
Molluscs	*Balea nitida* *Plutonia finitima*	
Arthropods	*Agyneta depigmentata* *Aprostocetus azoricus* *Atheta aptera* *Bradysia truncorum* *Cheiracanthium floresense* *Clinocera storai* *Hermannia woasi* *Jaera guernei* *Jaera insulana* *Melanozetes azoricus floresianus* *Mniophilosoma obscurum* *Neomariania incertella* *Ocydromus derelictus* *Trichonta floresiana*	
Amphibians		*Rana perezi*
Birds	*Carduelis carduelis* *Columba livea atlantis* *Columba palumbus azorica* *Coturnix coturnix conturbans* *Fringilla coelebs moreletti* *Gallinago gallinago* *Oenanthe oenanthe* *Regulus regulus inermis* *Scolopax rusticola* *Serinus canaria* *Sturnus vulgaris* *Sylvia atricapilla atlantis* *Turdus merula azorensis*	*Anas crecca* *Anas platyrhynchos* *Anas rubripes* *Ardea cinerea* *Aythya collaris* *Egretta garzetta* *Fulica atra* *Gallinula chloropus* *Limnodromus griseus* *Motacilla cinerea patriciae* *Pluvialis dominica* *Tringa solitaria*
Mammals	*Myotis myotis* *Nyctalus azoreum* *Pipistrellus maderensis*	

The importance of the Biosphere Reserve proposal for migratory birds is also to highlight. The position of the island in the middle of the ocean gives it an important role as a point of rest and feeding of several species of waterbirds.

12.1.3. Main human impacts

Extensive agriculture and forestry, road and communication works, extraction of inert material (rock, gravel and sand), exploitation of water resources and tourism are the main activities with negative impact on the biological features of Flores Island. Major threats consist of grazing and trampling of vegetation with conservation interest, degradation of wetlands, increased risk of erosion and landslides, proliferation of exotic species and deposition of waste.

12.1.4. Relevant management practices

This area will be managed within the Natural Park of Flores Island, and is covered by the Natural Reserve of Morro Alto, the Natural Monument of Rocha dos Bordões, The Protected Area for the Management of Habitats or Species of Caldeira Funda and Rasa, and the Protected Landscape Area of Zona Central.

The main goals for this area are: to preserve habitats, ecosystems and species in favourable conditions; to assure ecological processes; and to protect structural features of the landscape, its geology and geomorphology. Higher negative impact activities (such as harvest or capture of protected species, landworks and changes in vegetation cover, introduction of exotic species) are thus prohibited and other activities (like construction and landscape restoration) are subject to official authorization.

12.2. COASTAL AREAS (REGIONAL)

12.2.1. Characteristic species

Shrub woodlands of *Erica scoparia* ssp. *azorica*, *Myrica faya*, *Picconia azorica* and *Juniperus brevifolia* characterize the vegetation of Flores Island. Additionally, it is possible to find in Flores rare endemic plant species listed in the Habitats Directive.

In these areas nest several colonies of seabirds. The islets of Alagoa and Baixa do Moinho have, in some years, the largest colony of pink stern (*Sterna dougallii*, **Figure 40**) of the archipelago, reaching 40% of the European population, and therefore a unique status which should be preserved at all costs. It is located Flores one of the two areas in

the Azores where nest the Manx shearwater (*Puffinus puffinus*), and the populations of Cory's shearwater (*Calonectris diomedea borealis*) and *Pufinus assimilis baroli* are also important in the archipelago context.

The distribution of terrestrial vertebrates on the island is little known, and it is likely that many of mollusks and arthropods refered in the wetlands also occur on the coastline.

The **Table 3** summarizes the most characteristic species of cliffs and islets.

Figure 40. Pink stern (*Sterna dougallii*).

12.2.2. Important natural processes

The land component of the coastline of the Flores Island, a significant percentage of which is included in the buffer zone, consists of extensive coastal cliffs and high cut by inumerous bays with streams and waterfalls, islands, rocky beaches, cliffs, natural terraces, caves submerged and semi-submerged, the result of a strong sea erosion. The sea mobilizes the rocks of the coastline and wears the basis of the cliffs, originating rockfalls of variable intensity, often associated with weather, as heavy rains, or earthquakes. Forming this way the coastal landscape in the generality of the island, with high cliffs and soil and/or rocky material deposited on some points of its base. The ecosystems are fragile and are in permanent mutation and are spots in different stages

of ecological succession depending on the date they were formed. The vegetal cover of the cliffs and islets is generally poor and harsh, because of the small thickness of the ground and the high slope.

The Florentine (from Flores) is geomorphologically old and its deep Atalantic nature makes this island highly representative of priority habitats and coastal vegetation in the Habitats Directive (such as shrub woodlands endemic to Macaronesia and Macaronesian cliff plant communities). Cliffs and islets are also an important part of the Protected Area network of the Azores for their colonies of seabirds, and are thus listed in Annex I of the Birds Directive.

Table 3. Characteristic species of cliffs and islets.

Group	Species
Plants	*Ammi trifoliatum* *Angelica lignescens* *Azorina vidalii* *Culcita macrocarpa* *Dracaena draco* *Erica scoparia azorica* *Euphorbia stygiana* *Frangula azorica* *Myosotis maritima* *Picconia azorica* *Spergularia azorica* *Woodwardia radicans*
Reptiles	*Lacerta dugesii*
Birds	*Calonectris diomedea borealis* *Larus cachinnans atlantis* *Oceanodroma castro* *Puffinus assimilis baroli* *Sterna dougallii* *Sterna hirundo*

12.2.3. Main human impacts

The natural habitats of Flores Island were considerably altered since the colonization of the island as a result of agricultural activity, including livestock exploitation (sheep and then cattle) and the introduction of invasive plant species. At present, the main potentially harmful activities for the coastal areas of Flores Island are civil construction (roads and other infrastructures), the introduction of exotic species of flora and fauna, deposition of waste on the coast, and disturbance of seabirds colonies (fishermen, tourists).

12.2.4. Relevant management practices

This area will be managed within the Natural Park of Flores Island, and is covered by the Natural Reserves of Maria Vaz, Alagoa and Baixa do Moinho Islets, the Protected Areas for the Management of Habitats and Species of Costa Norte, Costa Sul and Ponta da Caveira and the terrestrial area of the Protected Area for Resource Management of Costa Norte.

In the most sensitive areas (Maria Vaz, Alagoa and Baixa do Moinho Islets) berth and disembarkment are forbidden except for rescue operations, in order to preserve favourable conditions of habitats, ecosystems and species, and to maintain ecological processes. Limpet collection is also forbidden in these places.

The main goals for this area are: to preserve habitats, ecosystems and species in favourable conditions; to assure ecological processes; and to protect structural features of the landscape, its geology and geomorphology. Higher negative impact activities (such as harvest or capture of protected species, landworks and changes in vegetation cover, introduction of exotic species) are thus prohibited and other activities (like construction and landscape restoration) are subject to official authorization.

12.3. MARINE AREAS (REGIONAL)

12.3.1. Characteristic species

The seabottom are rocky covered by algae, looking up a zonation in depth. The area between the tides is characterized by multi-carpet specific *Ceramium*, *Chondracanthus* or *Corallina*, while submerged in the area dominates the port of leafy species such *Pterocladiella capillacea* (a species with commercial use in the production of agar), *Halopteris filicina*, *Dyctiota* spp. or *Zonaria tournefortii*. The same type of zonation is visible in invertebrates: the barnacles edible (*Megabalanus azoricus*) or the limpets (*Patella* spp.) Concentrate on the first meter, while the chip or the lobsters are at greater depths.

Several species of fish dwelling at length all marine habitats of the island of Flores. Some, like the blue wrasse (*Centrolabrus caeruleus*) or "raínha" (*Thalassoma pavo*) are particularly frequent in little deep rocky areas, other shelter on the cracks during the day (such as morays, *Muraena helena*, or hake, *Phycis phycis*), Others are drifting between the rocky reefs, such as "vejas" (*Sparisoma cretense*), the "salemas" (*Sarpa salpa*) or the sargus (*Diplodus sargus*). In many caves around the coastal zone of Flores, it is

frequent to find the dusky grouper (*Epinephelus marginatus*) and "encharéus" (*Pseudocaranx dentex*) with an unknown frequency in the other islands.

The island of Flores has a significant fisheries activity focused on coastal fishing craft. The main species caught, either in quantity or value is in the red sea bream/"peixão" (*Pagellus bogaraveo*), with an annual maximum of 93 tonnes. It follows the "cherne" (*Polyprion cernius*) and "pargo" (*Pagrus pagrus*), with annual maximum of 19 tonnes each. The bigeye tuna (*Thunnus obesus*), the skipjack tuna/"bonito" (*Katsuwonus pelamis*), the "lírio" (*Seriola* spp.), the bream (*Diplodus sargus*) and the "chicharro" (*Trachurus picturatus*) have maximum annual catch over 1,000 kg. Overall, the annual catches ranging between 60 and the 120 tonnes, equivalent to 15-30 kg per capita, a figure similar to that recorded in other islands with little capacity to export and processing without infrastructure, as Graciosa and São Jorge.

Special remark to the fact that some species are more frequent in Flores Island that in other islands of the archipelago. These are the cases of the limpets (*Patella* spp.) the rock lobster (*Scyllarides latus*) and the dusky grouper (*Epinephelus marginatus*). The dusky grouper in classified as vulnerable in the red book of Vertebrate of Portugal. All of theses species are covered by regional management measures.

The marine area includes also several species of sea birds, which are referred in 12.2.1.

Other vertebrate animals that depend on this area include sea turtles, of which is commonly sighted the loggerhead turtle (*Caretta caretta*), and cetaceans. Of these, are observed along the coast mainly Delphinidae, such as "roazes" (*Tursiops truncatus*), common-dolphins (*Delphinus delphis*), the Atlantic spotted dolphin (*Stenella frontalis*) or the Risso's dolphin (*Grampus griseus*), while more off occur seasonally "cachalotes" (*Physeter macrocephalus*) and whales (e.g. Common whale, *Balaenoptera physalus*, dwarf whale, *B. acutorostrata*, and "sardinheira", *B. borealis*). All these species are included in Annex IV of the Habitats Directive, which are listed plant and animal species of community interest that require a strict protection.

The **Table 4** summarizes the most characteristics marine species of Flores.

12.3.2. Important natural processes

Pieces of rock emerge in the open ocean, the ocean islands are areas of high ecological importance. The little deep substrate, of great structural complexity offers immobilization to a variety of coastal plant and animal organisms. The seedlings of these animals and plants are brought by the currents, allowing the oceanic islands, thus, some

gene flow between adjacent mainland areas. At the same time, however, the isolation of these islands makes them a potential platform for speciation. Areas less profound, including tide zones, have geomorphological features that make them conducive to growth of juveniles of various species of fish, performing duties of motherhood. The coastal marine area of the island of Flores is still marked by the coexistence of a variety of types of bottom which, though there are elsewhere in the archipelago, have a density much higher here, one can find in the same area bottoms representing its very type and in excellent state of preservation. Among these there is an important biotope typified the Habitats Directive, the marine submerged caves or semi-submerged (**Figure 41**). This biotope serves as a habitat for unique communities of invertebrates (sponges, bryozoans, and shrimps, among others) that reach densities significant.

Table 4. Characteristics marine species of Flores.

Group	Litoral Zone	Oceanic Zone
Algae	*Asparagopsis armata* *Asparagopsis taxiformis* *Caulacanthus ustulatus* *Centroceras clavulatum* *Cladostephus spongiosus* *Codium fragile* *Corallina elongata* *Dictyota* spp. *Halopteris filicina* *Padina pavonica* *Petrocladiella capillacea* *Stypocaulon scoparium* *Zonaria tournefortii*	
Invertebrated	*Maja capensis* *Megabalanus azoricus* *Octopus vulgaris* *Palinurus elephas* *Patella aspera* *Patella candei* *Scylarides latus*	*Physalia physalis* *Pelagia noctiluca*
Fishes	*Coryphoblennius galerita* *Epinephelus marginatus* *Mullus surmuletus* *Pagellus bogaraveo* *Pagrus pagrus* *Parablennius ruber* *Phycis phycis* *Polyprion cernius* *Trachurus picturatus*	*Cheilopogon pinnatibarbatus* *Makaira nigricans* *Katsuwonus pelamis* *Thunnus alalunga* *Thunnus obesus* *Tetrapturus albidus*
Reptiles		*Caretta caretta* *Lepidochelys olivacea*
Birds	*Calonectris diomedea borealis* *Egretta garzetta* *Oceanodroma castro* *Puffinus assimilis baroli* *Sterna dougallii* *Sterna hirundo*	
Mammals		*Delphinus delphis* *Grampus griseus* *Physeter macrocephalus* *Stenella frontalis* *Tursiops truncatus*

Figure 41. Marine caves.

Raising from the sea depths to the surface, the islands represent barriers to ocean circulation that cause the rise to the surface of water laden with nutrients, that they add to the flowing fields of fertile land, thereby generating systems in these coastal ocean conditions of Local high productivity. This productivity not only maintains the coastal habitats: their influence also extends to the areas surrounding pelagic and deep, either through the collapse of organic matter or through vertical and horizontal migration of many species. Examples of the latter phenomenon found in the huge migrations that schools of small fish of intermediate depths perform every night until the surface to feed the abundant plankton. Since returning to normal depths day these fish are themselves food for other species such as squid which, in turn, attract from all corners of the ocean cachalotes them that they eat.

In general, existing resources in the coastal marine area are critical for breeding and feeding of protected species, while ensuring the livelihood of an entire row linked to professional fishing contributing hence to food security of populations. Finally, directly or indirectly constitute an essential element of tourism, a source of income with increasing importance.

12.3.3. Main human impacts

Given the small size of urban areas and difficult accessibility to most of the coastline, evidence suggests a low level of human impact on the coastal areas of Flores Island. The professional and recreational exploitation of coastal resources (fishing, spearfishing and shellfish collecting) and the accumulation of waste on the coast are considered the main threats for these areas. Illegal collection of limpets and other shellfish with SCUBA gear poses a threat not only because of its overexploitation potential, but also because of the impact it causes on the substrata they live on.

Other activities will cause other impacts: fisheries might overexploit resources, and increase marine traffic; the observation of cetaceans also increases marine traffic that might disturb these animals and scare them away from their natural habitat; the extraction of coastal sand, gravel and rock might disturb nesting seabirds forcing them out of their nests or even destruct habitats or species listed in Directives created to protect these. However, in Flores Island the main actual impact is the accumulation of waste on the shore and a consequent contamination of the food chain (lead, mercury and others).

12.3.4. Relevant management practices

The Protected Area for Resource Management of Costa Norte will be managed within the Natural Park of Flores Island. Waste disposal, extraction and exploitation of minerals and the construction of new geological resource exploitation facilities are forbidden, while seabed alterations and cultural and sports events are subject to previous authorization. The remaining coastal area is subject to the existing legislation on fisheries, navigation and public hydric domain.

12.4. RURAL AREA (LOCAL)

Soils used for agriculture and forestry occupy large extensions of Flores Island (8,430 ha), although divided into small plots. Livestock farming occupies the largest stretch of land, while agricultural use is mainly for subsistence, and thus varied - the main crops are of potatoes and corn for forage and grain.

Impacts from these activities are associated mainly with intensive livestock farming, namely because of the use of agrochemicals and the conversion of natural vegetation into pasture. However, this impact has been declining.

The management of agriculture and forests is constrained by the Regional Agricultural Reserve. In this context all actions that penalize the agricultural or forestry potential of land, or that result in its use for non-agricultural/forestry purposes are forbidden, including the construction of buildings, embankments and excavations. The Agrarian Development Services were created to follow up and support agricultural activity.

The objectives of the regional strategy for rural development for the period 2007-2013 and the means to achieve them are defined in the Program for Rural Development of the Autonomous Region of the Azores. This is an important tool for the harmonization of agricultural activities with environmental aspects. This programme comprises a line of action for improving the environment and rural landscape, namely through financial incentives. It is recognized that environmental concerns in rural areas improves quality of life and allows the sustainable management of natural resources, thus being increasingly valued and demanded by society. It is consequently fundamental to promote agricultural environmentally friendly measures that maintain or restructure sustainable rural systems with positive effects on the environment.

12.5. URBAN AREA (LOCAL)

Urban soil occupies an area of 2,256 ha and is divided into various classes. It is concentrated mainly in Santa Cruz das Flores and Ponta Delgada (the only with industrial areas), and other minor population clusters. Most of the population works in the tertiary sector, and dairy is the main industrial activity with a factory located in Santa Cruz. One of the major environmental impacts of these areas is urban and industrial waste, currently transported to two open-air waste deposition areas, which is considered of high environmental risk by PEGRA. However, a sanitary landfill project is already underway. Simultaneously, PEGRA is planning for the construction of a Waste Processing Centre and an Organic Waste Recovery Centre in Flores Island. The first is intended for packaging, storage, compression and transfer of recyclable materials, hazardous industrial waste and special waste. The second will focus on the collection of undifferentiated urban solid waste and non-hazardous industrial waste and simplified composting of urban organic waste and forest residues. Sewage is another major impact of urban areas. Most houses in Flores Island are equipped with septic tanks. Santa Cruz has already a sewage collection network, but it is not equipped with a treatment plant. As such, wastewater is discharged directly into the sea. Land use in urban areas of Flores Island is managed through the Municipal Director Plans of Santa Cruz das Flores and Ponta Delgada.

13. CONSERVATION FUNCTION

13.1. CONTRIBUTION TO THE CONSERVATION OF LANDSCAPE AND ECOSYSTEM BIODIVERSITY

Flores Island is highly diverse in terms of landscape and biological and cultural resources.

In the rural areas, agriculture and livestock farming led to a humanised landscape of high cultural significance, though some areas were kept as a refuge for important biological assets and unique ecosystems. Rural landscape is thus a mosaic of diverse patches of mixed crops and natural and semi-natural fields.

Urban areas of Flores Island are concentrated in Santa Cruz and Lajes (the only with industrial areas) and in small clusters scattered mostly in coastal zones. The central part of the island is significantly dominated by vegetation and geological features and has a low population density.

The humid climate in the hihest parts of the island favour the occurrence of various ecosystems such as endemic macaronesian heaths, raised peat bog, peat bog woodlands and laurissilva woodlands of the Azores. Flores and Corvo Islands have the largest and oldest peat bogs in Portugal that host a series of endemic species and constitute an important hydric support for these islands.

The northern area is characterized by cedar woodlands (*Juniperus brevifolia*) with hay (*Deschampsia foliosa*), dominated by peat bogs in the northwest and northeast. The central part of the island is covered in peat bog cedar woodlands and a large area of wetlands. Scenic lakes in this part of the island (such as Lagoa Funda, Rasa, Azul, Branca, Negra, Comprida and Lomba) serve as important nesting, feeding, resting and refuge habitats for migrating freshwater birds, namely the white heron (*Egretta garzetta*, **Figure 42**). Most of these lakes are enclosed reservoirs of rainwater accumulated in the surrounding peat bogs.

Habitat diversity increases at lower altitudes, with the occurrence of several types of wetlands and shrub woodlands that host the pigeon *Columba palumbus azorica* (an endemic sub-species to the Azores, constituting 2 to 15% of its actual population), and an important set of protected plant species can be found, namely *Ammi Trifolium*, *Azorina vidalii*, *Erica scoparia*, *Euphrasia azorica*, *Isoetes azorica*, *Piconnia azorica*, among others. This is also where the Natural Reserve of Morro Alto, the Natural Monument of Rocha dos Bordões (an impressive geological feature), the Protected Area for the Management of Habitats or Species of Caldeira Funda and Rasa, and the

Protected Landscape Area of Zona Central can be found. The protection status and management of these areas are envisaged in the Natural Park of Flores Island.

Figure 42. White heron (*Egretta garzetta*).

The coastline of Flores Island is predominantly rocky and irregular in shape, where high cliffs are cut by streams and waterfalls alternating with bays and inlets. Strong marine erosion has led to a complex system of rocky beaches, terraces, submerged and semi-submerged caves and islets. The latter are important as nesting habitats for seabirds, many of which are listed in Appendix I of the Birds Directive, and also as resting spots for migrating birds. The Islets of Alagoa and of Baixa do Moinho have the largest colony of pink stern of the archipelago that reaches 40% of its European population and should therefore deserve special conservation attention. Flores Island is also one of the only two islands of the Azores where the Manx shearwater *Puffinus puffinus* occurs.

High macroninvertebrate and fish (benthic and pelagic) diversity is triggered by the combination of high hydrodynamics and a constant recycling of coastal nutrients. Low-shore rocky substrata (intertidal zone) are dominated by seaweeds, mainly multispecific turfs (**Figure 43**), distributed either in patches or in bands.

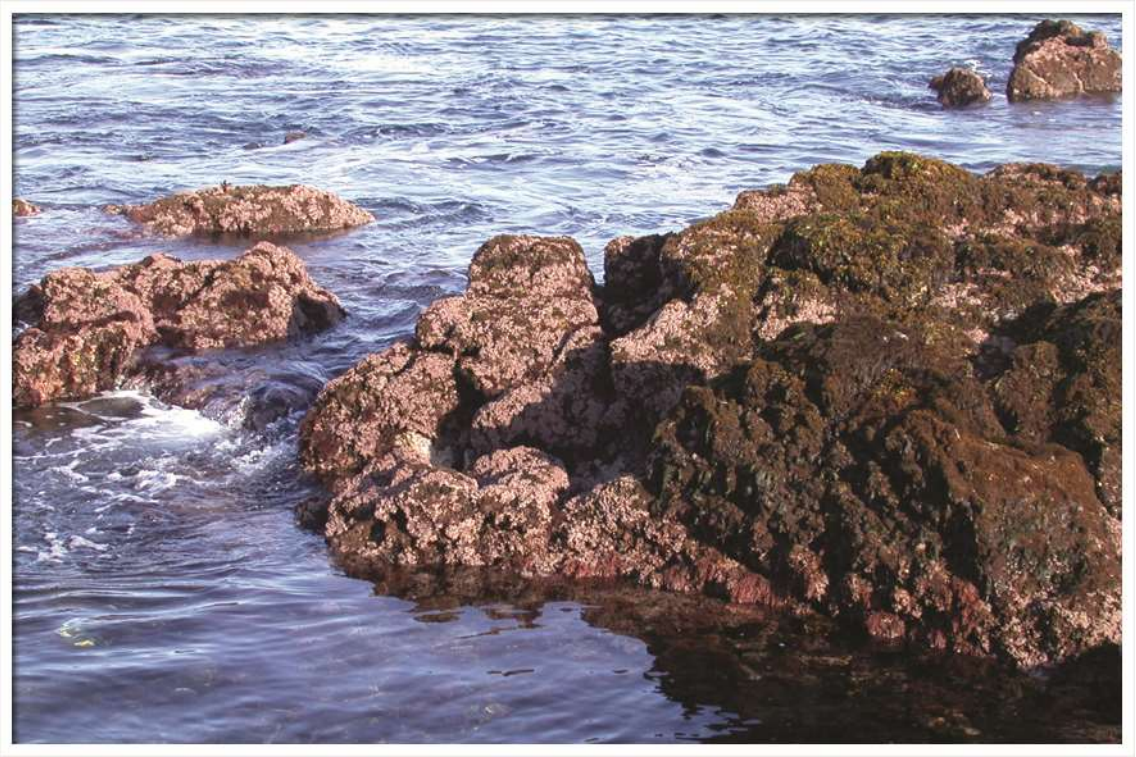


Figure 43. Multispecific algal turfs.

Marine areas are characterized by a great variety of substrata as in the rest of the archipelago. However, the density of different types of substrata is mucher higher in Flores Island. Submerged and semi-submerged marine caves, a biotope listed in the Habitats Directive, distinguishes the coastline of Flores Island from other coastal areas of the archipelago. Abundant submerged bedrock banks along the coast are also areas of high marine diversity. It is worth highlighting the coastal species that have commercial value and are simultaneously important in terms of conservation, such as limpets (*Patella aspera* and *P. candei*), the dusky grouper (*Epinephelus marginatus*), the island grouper (*Mycteroperca fusca*), among others.

Coastal areas are also an important reserve for woodlands of *Erica scoparia* ssp. *azorica*, *Myrica faya*, *Picconia azorica* and *Juniperus brevifolia* and other endemic plants such as *Azorina vidalii* (**Figure 44**), *Euphorbia stygiana*, *Spergularia azorica*, *Myosotis maritima* and *Euphrasia azorica*, the latter two only present in the western group. The population of more than 100 dragon trees (*Dracaena draco*) at the cliff of Lajes is unique in the Azores.

Figure 44. *Azorina vidalii*.

Flores Island's well preserved habitats and its distinctive features that support large populations of commercially important species has led the Regional Government to propose the creation of the Regional Natural Park of Flores Island. The intention was to integrate human activity in a harmonic way in order to valorize, protect and assure the sustainable use of marine resources. Measures are set to preserve habitats and species of high ecological, scientific and economic value. Placing Flores Island in a priority list for worldwide preservation of habitats and species is an important step to counteract the pace at which habitat loss was occurring on this island. Additionally, public discussion of the Regional Territorial Planning Act for the Azores (PROTA) is underway, which will contribute to the protection and management of habitats and natural resources of the archipelago.

The designation of Flores Island as a Biosphere Reserve will provide conditions for the development of projects that enhance environmental sustainability and ensure quality of life.

13.2. Conservation of species Biodiversity

Overall, the island of Flores shows 195 Azorean endemics. This wealth is particularly evident at the level of invertebrates and vegetation land.

Flowers occur in at least 73 of 77 species and subspecies of plants endemic to the Azores, one of them endemic of that island and two others known only from the islands of the Western Group. Of the endemic vertebrates in the Azores, 1 marine fish, 9 birds and a bat, only the priôlo (*Pyrrula murina*) does not occur in Flores, being restricted to Serra da Tronquiera in São Miguel Island.

At a smaller scale, but not least in terms of biodiversity, there are the invertebrates, of which the best known groups are the molluscs (slugs and snails) and arthropods (centipeds, millipedes, crustaceans, spiders, mites, insects, etc.). They are listed in the Azores 111 species or sub-species of mollusks, of which 49 are endemic, and 2,209 species or sub-species of arthropods, of which 267 are found only in this archipelago. Some of these species are endemic to a single island. Thus, 9 species and 1 sub-species of arthropods are known only from the island of Flores, putting it in third place at regional level, only behind São Miguel and Santa Maria. The level of shellfish, 2 of the eleven species present in flowers only on this island are known and do Corvo.

This high concentration of species endemic to the Azores islands earned their inclusion in the 25 high points of biodiversity in the world. The Biosphere Reserve proposal is therefore an important role to play in heritage conservation crop land Azores.

Below is a listing of species most important in terms of conservation, either because they are endemic or by having a special status to that level. When available, the names vernaculares in Portuguese and English are given in parentheses after the scientific name. Where relevant, are provided additional notes.

FLORA

Bryophytes

Endemic to the Azores (5)

Bazzania azorica H. Buch et Perss. - species classified with status R in the Red List of Bryophytes of Europe (rare taxa).

Breutelia azorica (Mitt.) Cardot.

Echinodium renauldii (Cardot) Broth. - species classified with status V in the Red List of Briphytes of Europe (vulnerable taxa). It is now considered one of the world's most threatened bryophyte.

Fissidens azoricus (P. de la Varde) Bizot.

Tylimanthus azoricus Grolle et Perss. - species classified with status V in the Red List of Briphytes of Europe (vulnerable taxa).

Endemic to Macaronesia with protection status (2)

Radula wichurae Steph. - species classified with status V in the Red List of Bryophytes of Europe (vulnerable taxa).

Tetrastichium virens (Cardot) Churchill - species classified with status R in the Red List of Bryophytes of Europe (rare taxa).

Endemic to Europe with protection status (6)

Aphanolejeunea azorica (V. Allorge et Ast) Pócs et Bernecker - Vulnerable species.

Frullania azorica Sim-Sim et al. - Vulnerable species.

Frullania microphylla (Gottsche) Pearson - Vulnerable species.

Hypnum uncinulatum Jur. - Vulnerable species.

Myurium hochstetteri (Schimp.) Kindb. - Vulnerable species.

Tetrastichium fontanum (Mitt.) Cardot – rare species.

Pteridophytes

Endemic to the Azores (6)

Asplenium azoricum (Milde) Lovis, Rasbach & Reichstein.

Dryopteris azorica (Christ) Alston.

Dryopteris crispifolia Rasbach, Reichstein & Vida.

Grammitis marginella (Sw.) Sw. ssp. *azorica* H. Schäfer – presence confirmed only in Flores Island.

Isoetes azorica Durieu ex Milde

Polypodium azoricum (Vasc) R. Fern. – rare species.

Endemic to Macaronesia with protection status (4)

Asplenium hemionitis L. – species listed in Annex IV of the Habitats Directive and Annex II of the Berne Convention. It is endemic to Macaronesia, Iberian Península and Mauritania. Species in critical danger in the archipelago.

Culcita macrocarpa C. Presl – species endemic to Macaronesia and Iberian Peninsula listed in Annex II of the Habitats Directive. Vulnerable species.

Diphasium madeirense (J.Wilce) Rothm. – Endangered species.

Isoetes azorica Durieu ex Milde – Rare species, listed in Annex II of the Habitats Directive.

Spermatophytes

Endemic to Azores (52)

Agrostis azorica (Hochst.) Tutin & Warb.

Agrostis congestiflora Tutin & Warb. ssp. *congestiflora*.

Agrostis congestiflora Tutin & Warb. ssp. *oreophila* Franco.

Agrostis gracililaxa Franco.

Agrostis reuteri Boiss. ssp. *botelhoi* Franco & Rocha Afonso

Ammi huntii H. C. Watson.

Ammi trifoliatum (H. C. Watson) Trel. (pé-de-pomba) - species included in Annex II of the Habitats Directive and Annex I of the Berne Convention; Critically endangered species.

Angelica lignescens Reduron & Danton

Armeria maritima (Mill.) Willd. ssp. azorica Franco.

Azorina vidalii (H. C. Watson) Feer - priority species in Annex II of the Habitats Directive and constant in Annex I of the Berne Convention; Critically endangered species.

Bellis azorica Hochst. ex Seub. (margarida/daisy).

Cardamine caldeirarum Guthn. ex Seub.

Carex hochstetteriana Gay ex Seub.

Carex pilulifera L. ssp. *azorica* (Gay) Franco & Rocha Afonso

Carex vulcani Hochst. ex Seub.

Cerastium azoricum Hochst. – endemic of the Western Group.

Chaerophyllum azoricum Trel.

Daboecia azorica Tutin & Warb. (queiró, queiroga/St. Dabeoc's heath).

Daucus carota L. ssp. *azoricus* Franco (cenoura-brava/-).

Deschampsia foliosa Hack. (feno/hair grass).

Erica azorica Hochst. ex Seub. (urze, vassoura/tree heath) – species listed in Annex II of the Habitats Directive and Annex I of the Berne Convention; Vulnerable species, regionally and locally.

Euphorbia azorica Seub. - priority species in Annex II of the Habitats Directive and constant in Annex I of the Berne Convention; Critically endangered species.

Euphorbia stygiana H. C. Watson (erva-leiteira/spurge).

Euphrasia azorica H. C. Watson (trovisco-macho/spurge) – species listed in Annex II of the Habitats Directive and constant in Annex I of the Berne Convention; Critically endangered species.

Festuca petraea Guthn. ex Seub. (bracéu, bracel-da-rocha/fescue).

Frangula azorica V. Grubov (sanguinho/-) - species listed in Annex II of the Habitats Directive; Endangered species in the Region.

Gaudinia coarctata (Link) Durand & Schinz.

Hedera azorica Carrière (hera ou hédera/-).

Holcus rigidus Hochst. (caniça, canição/-).

Hypericum foliosum Aiton (Milfurada, malfurada ou furalha/St John's wort).

Ilex perado Aiton ssp. *azorica* (Loes.) Tutin (azevinho/holly).

Juniperus brevifolia (Seub.) Antoine (cedro-do-mato/juniper).

Laurus azorica (Seub.) Franco (louro/laurel).

Leontodon filii (Hochst. ex Seub.) Paiva & Ormonde (patalugo-menor/ -).

Leontodon rigens (Dryand.) Paiva & Ormonde (patalugo-maior/-).

Lotus azoricus P. W. Ball.

Luzula purpureosplendens Seub. (saragaço/woodrush).

Lysimachia azorica Hornem. ex Hook.

Myosotis azorica S. Watson (não-me-esqueças/Azores forget-me-not) - species listed in Annex II of the Habitats Directive and Annex I of the Berne Convention. Critically endangered species.

Myosotis maritima Hochst. ex Seub. (-/-) - species listed in Annex II of the Habitats Directive.

Picconia azorica (Tutin) Knobl. (pau-branco/-) - species listed in Annex II of the Habitats Directive and Annex I of the Berne Convention; Endangered species.

Platanthera azorica Schlecht.

Platanthera micrantha (Hochst. ex Seub.) Schlecht.

Prunus lusitanica L. ssp. *azorica* (Mouillef.) Franco (-/-).

Rubia agostinhoi Dans. & P. Silva (ruiva, rapa língua/wild madder).

Rubus hochstetterorum Seub. (silvado-manso/bramble).

Scabiosa nitens Roem. & Schult. - species listed in Annex II of the Habitats Directive.

Spergularia azorica (Kindb.) Lebel (-/spurrey) - species listed in Annex II of the Habitats Directive. Vulnerable species.

Tolpis azorica (Nutt.) P. Silva (tolpis, olho-de-mocho/-).

Vaccinium cylindraceum Sm. (rosmaninho, uva-da-serra/azorean bilberry).

Veronica dabneyi Hochst.(verónica/-).

Viburnum tinus L. ssp. *subcordatum* (Trel.) P. Silva

Endemic to Macaronesia with protection status (1)

Dracaena draco (L.) L. ssp. *draco* (dragoeiro/dragon tree) - species listed in Annex IV of the Habitats Directive and in Annex I of the Berne Convention. Critically endangered species in the Azores, with an estimated population lower than 250 individuals.

FAUNA

Arthropods

Endemic to the Azores (101, 10 are endemics of Flores Island)

Acorigone acoreensis (Wunderlich, 1992)

Agyneta depigmentata Wunderlich n. sp. – endemic of Flores Island

Aphaniosoma azoricum Frey, 1958

Aphrodes hamiltoni Quartau & Borges, 2003

Aphrosylus argyreatus Frey, 1945

Aphrosylus calcarator Frey, 1945

Aprostocetus azoricus Graham, 1987 – endemic of Flores Island

Argyresthia atlanticella Rebel, 1940

Argyresthia minusculella Rebel, 1940
Ascotis fortunata azorica Pinker, 1971
Atheta aptera Israelson, 1985 - endemic of Flores Island
Atheta azorica Bernhauer, 1936
Atlantocis gillerforsi Israelson, 1986
Azorastia minutissima Frey, 1945
Bradysia truncorum (Frey, 1945) – endemic of Flores Island
Calacalles droueti (Crotch, 1867)
Calacalles subcarinatus (Israelson, 1984)
Cheiracanthium floresense Wunderlich n. sp. – endemic of Flores Island
Chrysotus elongatus Parent, 1934
Chrysotus polychaetus Frey, 1945
Chrysotus vulcanicola Frey, 1945
Chrysotus xanthoprasinus Bezzi, 1906
Cixius azoflorensis Remane & Asche, 1979 – endemic of Western Group
Clinocera azorica Wagner & Stauder, 1991
Clinocera storai Frey, 1945 – endemic of Flores Island
Cyclophora azorensis (Prout, 1920)
Dictyna acoreensis (Wunderlich, 1992)
Discobola freyana (Nielsen, 1961)
Dolichopus marshalli Parent, 1933
Dolichopus simillimus Parent, 1933
Elipsocus azoricus Meinander, 1975
Elipsocus brincki Badonnel, 1963
Ensina azorica Frey, 1945
Eudonia interlinealis (Warren, 1905)
Eudonia luteusalis (Hampson, 1907)
Eudonia melanographa (Hampson, 1907)
Eukiefferiella gracei (Edwards, 1929)
Eupteryx azorica Ribaut, 1941
Falbouria acorensis (Parent, 1933)
Galumna azoreana Pérez-Íñigo, 1992
Gibbaranea occidentalis Wunderlich, 1989
Halophiloscia guernei (Dollfus, 1887)
Hemerobius azoricus Tjeder, 1948
Hermannia woasi Pérez-Íñigo, 1992 – endemic of Flores Island

Hidryta atlantica Horstmann, 1990
Hipparchia azorina occidentalis (Sousa, 1985) – endemic of Western Group
Humerobates pomboi Pérez-Íñigo, 1992
Hyadina agostinhoi Frey, 1945
Jaera guernei Dollfus, 1889 – endemic of Flores Island
Jaera insulana Veuille, 1977– endemic of Flores Island
Jaera nordmanni Rathke, 1837
Jaera vulcana Veuille, 1982
Javesella azorica Remane, 1975
Laparocerus azoricus Drouet, 1859
Lepthyphantes acoreensis Wunderlich, 1992
Limnephilus atlanticus Nybom, 1948
Liriomyza subartemisicola Frey, 1945
Melanozetes azoricus floresianus Pérez-Íñigo,1992 – endemic of Flores Island
Mesapamea storai (Rebel, 1940)
Micrurapteryx bistrigella (Rebel, 1940)
Minicia floresensis Wunderlich, 1992
Mniophilosoma obscurum Gillerfors, 1986 – endemic of Flores Island
Neomariania incertella Rebel, 1940 – endemic of Flores Island
Neomariania oecophorella Rebel, 1940
Neon acoreensis Wunderlich n. sp.
Netelia atlantor Aubert, 1971
Noctua atlantica (Warren, 1905)
Noctua carvalhoi (Pinker, 1983)
Nothrus palustris azorensis Pérez-Íñigo, 1992
Nysius atlantidum Horváth, 1990
Ochthebius frey D`Orchymont, 1940
Ocydromus derelictus (Alluaud, 1926) – endemic of Flores Island
Ocydromus schmidti mequignoni (Colas,1939)
Orchestia chevreuxi De Guerne, 1887
Parachipetria floresiana (Pérez-Íñigo, 1992)
Pardosa acoreensis Simon, 1883
Philygria cedercreutzi Frey, 1945
Phloeostiba azorica (Fauvel, 1900)
Phlogophora interrupta (Warren, 1905)
Pieris brassicae azorensis Rebel, 1917

Pinalitus oromii J. Ribes, 1992
Pisaura acoreensis Wunderlich, 1992
Pseudechinosoma nodosum Hustache, 1936
Pseudolycoriella campanulata (Frey, 1945)
Rachispoda atrolimosa (Frey, 1945)
Rugathodes acoreensis Wunderlich, 1992
Sancus acoreensis (Wunderlich, 1992)
Savigniorrhipis acoreensis Wunderlich, 1992
Scaptomyza impunctata (Frey, 1945)
Scoparia aequipennalis Warren, 1905
Scoparia semiamplalis Warren, 1905
Simulium azorense Carlsson, 1963
Sphaerophoria nigra Frey, 1945
Strophingia harteni Hodkinson, 1981
Tarphius azoricus Gillerfors, 1986
Tarphius wollastoni Crotch, 1867
Telmatopelopia nemorum (Goetghebuer, 1921)
Trichonta floresiana Stora, 1945 – endemic of Flores Island
Udea azorensis Meyer, Nuss & Speidel, 1997
Walckenaeria grandis (Wunderlich, 1992)
Xanthorhoe inaequata Warren, 1905

Molluscs

Endemic to the Azores (11)

Acanthinula azorica Pilsbry, 1926
Balea nitida Mousson, 1858 – endemic of Western Group
Lauria fasciolata (Morelet, 1860)
Leiostyla fuscidula (Morelet, 1860)
Leptaxis azorica (Albers, 1852)
Napaeus delibutus (Morelet & Drouët, 1857)
Napaeus forbesianus (Morelet & Drouët, 1857)
Napaeus vulgaris (Morelet & Drouët, 1857)
Ovatella vulcani (Morelet, 1860)
Plutonia finitima (Morelet, 1860) – endemic of Western Group
Spermodea monas (Morelet, 1860)

Fish

Endemic to the Azores (1)

Centrolabrus caeruleus Azevedo, 1999 (bodião azul/ blue wrasse)

With protection status (1)

Epinephelus marginatus Lowe, 1834 (mero/grouper). Listed as vulnerable species in the Red Book of Vertebrates in Portugal.

Reptiles

With protection status (2)

Caretta caretta Linnaeus, 1758 (tartaruga careta/ loggerhead turtle). Classified as a priority species in Annex II of the Habitats Directive and in the Berne Convention and Annex I of the Bonn Convention. Listed as endangered species in the red book of Vertebrates.

Lepidochelys olivacea Eschscholtz, 1829 (tartaruga de couro/leather turtle). Classified as a priority species in Annex II of the Habitats Directive and in the Berne Convention and Annex I of the Bonn Convention. Listed as endangered by IUCN.

Birds

Endemic to the Azores (8)

Columba livia atlantis Bannermann, 1931 (pombo-torcaz/-) – not threatened

Columba palumbus azorica Hartert, 1905 (pombo da rocha/-) - not threatened

Fringilla coelebs moreletti Pucheran 1859 (tentilhão/-) - not threatened

Motacilla cinerea patriciae Vaurie, 1957 (lavandeira/-) - not threatened

Regulus regulus inermis Murphy & Chapin, 1929.

Sturnus vulgaris granti Hartert, 1903 (estorninho/-) - not threatened

Sylvia atricapilla gularis Alexander, 1898 (toutinegra de barrete negro/-)

Turdus merula azorensis E. Hartert, 1905 (melro/-)

With protection status (11)

Anas crecca Linnaeus, 1758 (marreco/common teal) - resident/visitor in the archipelago of the Azores. Listed in Annex III of the Bern Convention, Annex II of the Bonn Convention, Annex C of the CITES Convention, Annex II of the Birds Directive and Hunting legislation and regulation. DD status (insufficient information) in the Azores.

Anas platyrhynchos Linnaeus, 1758 (pato real/mallard) - resident/visitor in the archipelago of the Azores. Listed in Annex III of the Bern Convention, Annex II of the Bonn Convention, Annex C of the CITES Convention, Annex II of the Birds Directive and Hunting legislation and regulation. DD status (insufficient information) in the Azores.

Calonectris diomedea borealis Cory, 1881 (Cory's shearwater/Cory's shearwater) - has a low concern status in the archipelago (Red Book 2005). Other legal

instruments: Annex II of the Bern Convention. Most abundant marine bird in the Azores, where they represent 74% of the world population. The decline in world numbers in the last decades led to this species being considered vulnerable. On a European level, this species is considered Vulnerable, although temporarily.

Gallinago gallinago Linnaeus, 1758 (narceja comum/common snipe) - resident/visitor in the archipelago of the Azores. Listed in Annex III of the Bern Convention, Annex II of the Bonn Convention, Annex C of the CITES Convention, Annex II of the Birds Directive and Hunting legislation and regulation. DD status (insufficient information) in the Azores.

Gallinula chloropus Linnaeus, 1758 (galinha d'água/common moorhen) - resident/reproductive migratory bird in the archipelago of the Azores. Annex III of the Bern Convention, Annex II of the Birds Directive and Hunting legislation and regulation. Has a DD status (insufficient information) in the Azores.

Oceanodroma castro Harcourt, 1851 (angelito/band rumped storm petrel) - has a vulnerable/endangered status in the archipelago (Red Book 2005). Other legal instruments: Annex II of the Bern Convention.

Puffinus assimilis baroli Bonaparte, 1857 Baroli (frulho/macaronesian shearwater) - has a vulnerable status in the archipelago (Red Book 2005). Temporarily considered rare in Europe (BirdLife International 2004). Other legal instruments: Annex II of the Bern Convention.

Puffinus puffinus Brünnich, 1764 (Manx shearwater/manx shearwater) – endangered in the archipelago of the Azores. At a regional level, this marine bird species only nests of the islands of Flores and Corvo. Other legal instruments: Annex II of the Bern Convention.

Scolopax rusticola Linnaeus 1758 (galinhola/eurasian woodcock) - resident/visitor in the archipelago of the Azores. Listed in Annex II of the Birds Directive, Annex III of the Bern Convention, Annex II of the Bonn Convention. DD status (insufficient information) in the Azores.

Sterna dougallii Montagu, 1813 (garajau rosado/roseate tern) – emblematic species in the proposed Biosphere Reserve where its population represents 65% of the archipelago's total population and 40% of the European population. Has a vulnerable status in the archipelago (Red Book 2005). It is a priority species in Annex I of the Birds/Habitat Directives. On a European level, this species is considered rare. Other legal instruments: Annexes II of the Bern and Bonn Conventions.

Sterna hirundo Linnaeus, 1758 (garajau comum/common tern) - has a vulnerable status in the archipelago (Red Book 2005). Not considered threatened in Europe, although frequentl population declines in its European distribution. Other legal instruments: Annexes II of the Bern and Bonn Conventions.

Mammals

Endemic to the Azores (1)

Nyctalus azoreum Thomas, 1901 (morcego dos Açores/Azores bat) - species critically endangered (CR) in the Azores (IUCN Red Book 2005). Endemic to the Azores is the smallest species of the genus *Nyctalus* in Europe. It is an insectivorous species frequently active during the day. Specie listed in Annex IV of

the Habitats Directive, with strict protection status, Annex II of the Bern Convention and Annex II of the Bonn Convention.

Endemic to Macaronesia with protection status (1)

Pipistrellus maderensis Dobson, 1878 (morcego da Madeira/Madeira bat) - species critically endangered (CR) in the Azores (IUCN Red Book 2005). Endemic to Macaronesia and a resident species in the Azores having been registered on the islands of Santa Maria, São Jorge, Graciosa, Flores and Corvo. This species has low abundances in the Azores and, probably less than 300 individuals. Species listed in Annex IV of the Habitats Directive, with strict protection status, Annex II of the Bern Convention and Annex II of the Bonn Convention.

With protection status (10)

Myotis myotis Borkhausen, 1797 (morcego-rato grande/-). - Species listed as a priority species in Annex II of the Berne Convention, Annex II of the Bonn Convention and Annex II of the Habitats Directive.

Delphinus delphis Linnaeus, 1758 (golfinho comum/common dolphin) - Listed in Annex IV of the Habitats Directive and Annex II of the Bonn Convention.

Globicephala macrorhynchus Gray, 1846 (baleia piloto tropical/tropical pilot whale) - Listed in Annex IV of the Habitats Directive; considered of low risk but dependent on conservation by the IUCN.

Grampus griseus (Cuvier, 1812) (moleiro ou grampo/Risso's dolphin) - Listed in Annex IV of the Habitats Directive.

*Kogia simu*s Owen, 1866 (cachalote anão/ pygmy sperm whale) - Listed in Annex IV of the Habitats Directive.

Mesoplodon bidens (Sowerby, 1804) (baleia de bico/-beaked whale) - Listed in Annex IV of the Habitats Directive; its conservation status can not be determined due to lack of information (IUCN).

Physeter catodon Linnaeus, 1758 (cachalote/sperm whale) - Listed in Annex IV of the Habitats Directive; classified as vulnerable by the IUCN and listed in both appendixes of the Bonn Convention.

Stenella coeruleoalba (Meyen, 1833) (golfinho riscado/striped dolphin) - Listed in Annex IV of the Habitats Directive and Annex II of the Bonn Convention; considered of low risk but dependent on conservation by the IUCN.

Stenella frontalis (Cuvier, 1829)(golfinho pintado/Atlantic spotted dolphin) - Listed in Annex IV of the Habitats Directive; considered of low risk but dependent on conservation by the IUCN.

Tursiops truncatus (Montagu, 1821) (roaz/bottlenose dolphin) - Listed in Annex IV of the Habitats Directive; its conservation status can not be determined due to lack of information

13.3. CONSERVATION OF GENETIC BIODIVERSITY

Large scale production focuses on corn and potatoes and is based primarily on seeds and planting from abroad. Subsistence agriculture by most families in Flores Island is based on carrying seed or planting from one crop to the following. Subsistence agriculture focuses on corn (forage and grain), potato, sweet potato, yam, pumpkin (mainly for animal feed), beans, tomato, fig, banana, citrus and "araçaleiros".

There is no information on plant varieties specific from Flores Island. They are, however, likely to exist since traditional sequential reproduction processes tend to priviedge the selection of varieties that are adapted to local conditions.

14. DEVELOPMENT FUNCTION

14.1. POTENTIAL FOR FOSTERING ECONOMIC AND HUMAN DEVELOPMENT WHICH IS SOCIO-CULTURALLY AND ECOLOGICALLY SUSTAINABLE

There is considerable potential for the development of environmentally sustainable economic activities. Agriculture and fisheries, strongly linked to the history of the Azores, play a vital role in maintaining the landscape and preserving nature, and provide a critical social environment in rural areas.

The demand for goods produced in environmentally sustainable systems valorizes certified products and is increasing. The predominance of small farms in Flores Island does not allow the production of competitive products in traditional markets. However, with the development of products with certified environmental quality, specific markets that value quality at the expense of cost can be exploited. The valorization of products is possible for most human activities developed in Flores Island, and thus ensure social-economic development that is consistent with the objectives of a Biosphere Reserve.

Fisheries

With the establishment of the autonomic system in 1976, regional authorities soon become aware of the need to establish policies and measures to safeguard the marine resource. Since then there has been, by the regional authorities, a very vigorous action in safeguarding the sustainable exploitation of marine resources, deserving the emphasis on the economic exploitation that, by limiting the gear to be used, kept the craft methods. These objectives have been achieved with measures such as the prohibition of

the use of selective fishing gear, the appropriate size of fishing fleet to the resources available, the town's coastline, the regulation of tourist activities as whale watching, the preparation of plans management for all areas of Natura 2000, the implementation of its Global Sector Plan and, not least, the creation of protected areas.

It was also the same time that the region chose to include the study of issues related to the sea in the then University Institute of the Azores, now University of the Azores (UA). To do so, a Department of Oceanography and Fisheries (DOP), whose area of intervention is specific, a decision which has proved of great importance to the development of policies for the sector. Other organic units of the UA have also contribute to the greater scientific knowledge in that area, including the Departments of Biology and Earth Sciences.

As part of the presentation by the European Commission's Green Paper on European Maritime Policy, the Government of Azores presented in 2006, "An Azorean Contribution For the Future European Maritime Policy", thus contributing to the debate on this issue. Among other things, this document has drawn attention to the importance of the Azores, which despite its small land, enjoys the largest Exclusive Economic Zone of Europe. This importance is even more significant if we look on the one hand, the centralised strategic and privileged position held by the region in the world context and, secondly, the economic, social and environmental effects on the neighbouring EU countries, advenientes of possible disasters or accidents occurring within its maritime domain. It is, in short, have explicitly into account the reality and Atlantic island in the various sectoral aspects of European policy, such as environmental protection and the preservation of marine resources and biodiversity; surveillance and maritime security, the prevention of accidents, pollution and natural disasters; control of maritime borders and the compatibility of this with the European Security and Defence, just to mention some areas.

In the case of Flores island, the operation is characterized by fishing craft and be on a small scale, with gear hook (line of hand) to dominate the various fisheries. The active fleet is characterized by volumes of sale by boat relatively low. In 2001, the island's active fleet consisted of 19 boats, all with a lower volume of sales to a maximum of 25,000€, with the exception of a spread between 37,500 and 50,000€. A socio-economic study on the fishing industry in 2002 concluded that the fleet with better performance (net profit - €/t) are associated with the following parameters: a) fishing gear with operating line of hand b) cabin vessel c) Geographical location identified with the West and Central Group (in this case, particularly around the island Graciosa). The figures shown by small local fleets and coastal Flores, Corvo and Graciosa are symptomatic of

the benefit, or geographical location, or the type of gear used (line of hand), although the vessels summarize the operational characteristics of quite limited with very small ray of action. The quantity of fish unloaded in the ports of Flores, although been increasing, in 2005 represented only about 1% of total fishing unloaded at ports Azores.

The type of art practiced in Flores, together with the specifications for the appropriate use of the areas of fishing, it is essential to the conservation of resources. It is, therefore, a type of fishing oriented for economic development and social sustainability. This peculiarity, in line with the broad objectives European and World for the implementation of responsible fishing, appears to be, indeed, a very important added value to use as image of the circuit of national and international markets. In addition, the fact of the island to have a biological wealth and abundance diferenciadora of some commercial species is still a part to take advantage by promoting the quality of products, instead of quantity.

In the field of fisheries, outside 12 miles and up to 200 miles from the coast, the regulatory power is exercised nationally. The regulation of fishing up to 12 miles (Territorial Sea) is the responsibility of the Government. With the Regional Directorate of Fisheries is guiding, coordinating and monitoring the implementation of the policy for the fishing industry by promoting and supporting all measures necessary for the development of the sector.

The commercial fishing in IPR is regulated by Decree No. 7/2000 of May 30, defining the characteristics of the boats, gear and fishing methods allowed, referring to Ordinance (Ordinance No. 101/2002, 24 October) the establishment of the regulatory provisions of the characteristics of the arts and conditions for fishing by any gear. In addition to the above mentioned decree, Decree-Law No. 278/98, July 7, as amended by Decree No. 383/98, November 27, is to establish the conservation measures, management and sustainable use of resources of fauna and flora in the waters under Portuguese sovereignty and jurisdiction.

Regarding the leisure fishing (fishing, recreation, sports, tourism and underwater) in the seas of the Azores, came into force in June 2007, a new law on the activity, including prohibiting the marketing of any fish caught by this type of fishing. This legislation, approved by the Government to prevent that, in the guise of an alleged simple exercise and recreational fisheries, to develop an archipelago in the business of professional fishing, also establishes the universe of ways and capture of marine species and non-commercial provides the range of gear allowed. It also includes, rules governing the minimum catch sizes and seasons of living organisms capable of fishing, while the

arrangements counter-ordenacional associated with fishing and recreational means the entities responsible for monitoring and supervision control.

In addition to local and regional level, there is a shift towards a policy of sustainable development of this activity at the national level through the adoption of the draft "National Strategy for the Sea". This defines a set of strategic actions that identify cross-cutting measures that help to create favourable conditions for better use of the sea in a sustainable way.

Agriculture and livestock

The agricultural sector also offers great potential for sustainable economic and environmental development. This activity is still based on tradititional small farms with low production and highly dependent on potato and corn. The trend is also towards a reduction in total cultivated area.

Figure 45. Slaughterhouse building.

Exclusively extensive livestock farming represents about 2% of the export of cattle to foreign markets. While in São Miguel, Terceira and São Jorge Islands cattle breeds are mainly for the production of milk, in other islands meat and dairy cattle are crossbred. Indeed, there are Governmental incentives for the production of meat other than that of dairy cattle breeds.

Located in Santa Cruz and funded by the Region and the European Union, the slaughterhouse of Flores Island (**Figure 45**) started

operating in 1999 with capacity for 30 animals.

The Dairy Factory of Flores, also associated with livestock, was inaugurated in 1994, uniting the cooperativists of the island. The cooperativism in Flores Island was boosted by father José Furtado Mota in the 1910/20s. The factory was handed to the Cooperative Union of Flores Island and has 8 collection posts and about 40 producers. In 2007, the factory received 759,277 liters of milk and produced 67,620kg of cheese (5 varieties) and 996kg of butter. Products are sold for local consumption and exported to Lisbon and São Miguel.

Agriculture and forestry related activities occupy a significant part of the territory and have a crucial role in preserving the environment and rural landscape. Agriculture, livestock and protection forest are important in this context reinforced by the fact that Natura 2000 covers an important part of the island.

One of the mechanisms for the management of agricultural activity implemented in the Region is FEADER - European Agricultural Fund for Rural Development 2007-2013 (code of good agricultural practice), implemented in the Azores by the Prorural Program - the Azores Operational Programme for Agriculture. It creates a unique tool for financing rural development policies for the period 2007-2013. Its objectives are to increase competitiveness of the agricultural and forestry sectors, to improve the environment and rural area management, to increase quality of life and to diversify activities in rural areas. "Axis 2" of the Prorural Program (Improving the environment and the countryside) aims to promote the strategic sustainability of rural areas and natural resources through four measures: a) maintenance of farming in disadvantaged areas; b) agro-environmental payments and Natura 2000; c) support for non-productive investments; and d) forest management.

The Regional Agricultural Reserve (RAR) was established through the publication of the Regional Legislative Decree No 7/86/A, of February 25, amended by the Regional Legislative Decree No. 11/89/A, of July 27. This measure was intended to identify, protect and preserve areas with highest suitability for agricultural use in order to ensure the development of agriculture within proper land management in the Region. The last stage of this process was the adoption of the Charter of the Regional Agricultural Reserve (Ordinance No. 1/1992, of January 2) that consists of nine maps, each corresponding to one of the islands of the Azores archipelago, where the soils are classified by groups (arable and not arable), by classes (I to VII), and further four subclasses based on additional information that expresses the dominant type of restriction or risk of soil degradation.

Additionally, the PROTA - Regional Territorial Planning Act for the Azores (in public consultation phase), and the PDM - Municipal Director Plan, regulate the spaces and types of farming on the island.

Professional training in agriculture carried out in Flores Island, also contributes greatly to the implementation of practices that allow its economic development, while preserving natural resources.

It is noteworthy in this context that would still be of great interest include the training and awareness raising the emerging field of "business and biodiversity", where the emphasis is on both diversification and excellence of the product and the protection of biodiversity. That is, we must mitigate the damage on species and habitats, because they are based around the business, in other words, without a system of biological diversity, lively and strong, there is no lasting economic activity. This combination of the development of agro-livestock activities with the conservation of biodiversity may go through various actions, such as:

- Develop the production of organic form, promoting energy efficiency and saving natural resources;
- Give preference to one form of seed that did not revolve the earth and prevents the release of carbon into the atmosphere;
- Choose breeds reared without antibiotics to cure colds and without chemicals in food;
- Extend the care in the setting up processing and distribution.

Practices such as these allow not only the sustainability of the soil and sustainability of agro-livestock activities by the regeneration of ecosystems, but ensure the maintenance of tranquillity and beauty of landscapes as a tourist attraction.

Local products

Flores Island's main processed product is cheese. However, butter production could be increased and processing extended to different types of products. Similarly, other sectors may develop such as leather production from the skin of cattle, or resumption of the collection of agar producing algae (in the 60s and 70s it was exported to São Miguel, where agar was extracted and exported to Japan). High quality agricultural production of fruit, vegetables, flowers and bee products can also constitute important opportunities. The traditional production methods are of high landscape and cultural value (live fences of hydrangeas and walls of basalt rock).

Craft is also poorly developed in Flores Island and likely to be further exploited and diversified. Incentives could be given for the recovery of old looms and resumption of tapestry and traditional clothing production, and the production of sheep wool revitalized. Such initiatives would boost these activities and restore cultural traditions like the collective sheep shearing, which was held in a festive environment.

Tourism

The natural and cultural patrimony of Flores Island provide a solid basis for a proper and varied development of tourism without the danger of becoming dependent on a single bet. The combination of all factors that confer a unique value to this island (natural and built patrimony, traditions and customs, architecture, handicrafts, ethnography, local products) will allow the harmonious and sustainable growth of tourism and boost the local economy.

POTRAA - the Tourism Planning Act for the Autonomous Region of the Azores sets guidelines for the social, cultural and environmental sustainable development of such activities, based on the exploitation of Flores Island's unique patrimony. The Natural Park of Flores Island is being created simultaneously to discipline tourism and recreational activities and prevent the degradation of natural and scenic values, allowing sustainable development.

Renewable energy

Flores Island has a wind farm since 2002, located in Boca da Vereda. It has a total installed power of 600 kW provided by two air-generators, which contribute 17% to the total energy produced. Overall, the Azores archipelago has 22 air-generators with an installed capacity of 5,250 KW (**Figure 46**).

There is also in Flores Island a hydroelectric power plant, built in 1966 in Além Fazenda, with an actual installed capacity of 1,480 kW. There are 12 hydroelectric plants in the whole archipelago, with a total installed power of 8.191,4 kW. In the Azores there are no major river basins with potential for storing large quantities of water, thus hydroelectric plants continuously seize the momentary water flow. This type of exploitation does not have the drawbacks of large hydroelectric exploitations like those in mainland Portugal and other countries, where large areas are flooded with highly negative impacts on the environment.

Approximately 52% of the electricity actually consumed in Flores is from renewable sources (wind and water).

Wave energy has enormous potential in the Azores, because of its north Atlantic location where hydronamics is high. Dissipation of wave energy due to the interaction with shallow bottoms is relatively small because of the inexistence of a continental shelf. Therefore waves hit the shores of these islands with energy levels that are much higher than on the mainland.

Figure 46. Landscape with the 2 aerogenerators of the island.

The Azores prime location for the use of wave energy and its energy dependence have led the Electricity of the Azores (EDA), together with the Institute of Technology (IST), the National Laboratory of Industrial Engineering and Technology (INETI) and later Electricity of Portugal (EDP) to develop measures for the use of wave energy, for a decade now. After assessing the energy potential, Porto Cachorro (Pico Island) was chosen as the most suitable for the installation of an oscillating water column type central (better adapted to the existing conditions). Construction was completed by mid of July 1998, the assembly of electromechanical equipment took place during 1999, and the first kW produced on October 15 of that year.

The energy independence for Flores Island is also one of the objectives of a national project for the Azores. A national project for the Azores called "Green Island" conducted by the Technical Institute (IST) seeks total energy autonomy for Flores Island, based on geothermal energy, wind farms and minihydric plants and mass introduction of electric

cars to reduce the consumption of fossil fuels. The project envisages the assessment of the whole archipelago's energetic autonomy, but its authors believe that Flores Island has the appropriate conditions for implementing the preliminary tests.

The increased social-economic development brought by the Biosphere Reserve status will necessarily require an increase in energy consumption. Investing in renewable energy could thus facilitate the sustainable development of activities in Flores Island.

Waste management

The Strategic Plan for Waste Management of the Azores (PEGRA), will, after approval, the normative instrument of reference for waste management in the Azores, is a contributory factor to ensure the recovery of natural resources, protection of quality ecosystems and safeguard public health in the Region.

On the island of Flores, municipal solid waste (which accounted in 2005, 2% of 132 335 tonnes. produced in the archipelago are now routed to two landfills, one in each county on the island. However, the PEGRA provides for the construction of two technological units on the island: the Center for Processing and screening (CPT) and the Center of Recovery by Organic Composting (CVOC). The Center for Processing is for the receipt, packaging, storage, compression and transfer of recyclable materials, hazardous industrial waste and special waste. The Center for Organic recovery by Easy Composting is for the receipt of municipal solid waste undifferentiated and non-hazardous industrial waste, processing for collection of waste with a view to its use in compost and the receipt of material timber (forest residues) and grinding, for the production of material for composting structuring.

In addition to these technological units of Flores should be provided for the construction and operation of a landfill for the containment of technical inert waste, especially waste from construction and demolition (RCD), and a unit of hospital waste transfer of the group III and IV to the island where the unit is installed in treatment of such waste (waste of Group IV will be dispatched to the continental territory for final treatment - incineration). For Flores and other smaller islands, these measures should be considered as transitional, to address an urgent situation of lack of adequate infrastructure in these islands, before we can prepare the waste management system for the strategic direction more important, to the recovery, in line with the vision that actually took PEGRA. However, it's in these islands that there is a renewed effort to raise awareness and environmental education for the collection and separation at source, the organic fraction of MSW, seeking to minimize the entry into the landfill.

In short, it was found that, consistent reasons for recovery of environmental quality, safeguard public health and integration into the legal framework of the European Union (EU), waste management should provide high protection of the environment and human health, without that goal affect the social and economic development. Rather, adequate waste management can contribute to strengthening the competitiveness of the Region and to give it an additional added value.

Development needs

Possibly one of the areas that needs further development on the island of Flores is transport due to low efficiency and quality of commercial and passenger links with the other islands of the Region.

The existing air routes are not the ideal for the development of tourism and even for internal mobility. With the exception of the summer, the number of flights is small and lacking on Sundays. The limited positioning of the airport runway when combined with strong winds and cross leads to the cancellation of flights throughout the year (with minor occurrence during the summer). Moreover, that the potential capacity of the aircraft and its load capacity of perishable goods, or with demands for rapid transport, are also limited.

Regarding the transport of passengers by sea between Flores and other Azores islands, it is noted their absence, almost total, over much of the year. During the summer the transport of passengers is carried by ferry on a weekly basis but at a distance of up to two days of travel to the islands of the eastern group.

In terms of maritime transport of goods continues to live on the island, an environment of uncertainty due to the spacing of links fortnightly, sometimes irregular, especially during the winter, which leads to the collapse of stores and causes, cyclically, the lack of Perishable products more easily.

The internal terrestrial links are provided by a bus service for the attention of the Federation of Municipalities, an institution that includes the two municipalities of the island and public transport of Flores. However, the regularity of this means of transport is limited to three days a week and given the small number of buses available, it is necessary to stop at various parishes, transforming virtually any small movement in a long"tour".

14.2. IF TOURISM IS A MAJOR ACTIVITY

Tourism development in the Azores in now a priority for the Regional Government since it became an emerging sector, in terms of demand and supply.

On Flores Island two major groups of visitors can be identified based on the purpose of their trip: leisure (outdoor activities such as bathing, ecotourism, scenic and cultural visits); common interest (between the visitor and the visited - visits to friends and/or family – namely emigrants in the U.S. and Canada and/or residing on mainland Portugal).

In 2007 4,263 guests visited Flores Island, totaling 15,418 nights, and an average stay of 3.6 days. The average stay is longer in guesthouses (especially private accommodation), although the vast majority of guests stay in traditional hotels: 2.6 days in traditional hotels; 2.4 days in rural area tourism facilities; 5.5 days in guest houses and 25.7 days in private accommodation. Most visitors of Flores Island in 2007 came from mainland Portugal, a total of 2,950 guests totaling 12,030 nights, while 1,313 foreigners totaling 3,388 nights came from abroad. The vast majority of foreign tourists is German (505). However, the U.K. (169), the U.S. (116) and Spain (113) are also relevant countries of origin, followed by many others such as Italy, France, Swizerland, Denmark, Belgium, Canada, Sweden, Austria, Finland, Brazil, Holland, among others.

Although the number of visitors in not high, it is possible to observe a seasonal trend in the flow of tourists to the island. The number of stays starts increasing in June, reaching its peak in the second half of July and in August, decreasing significantly after the second half of September. The months of May through September are thus considered high season, with higher accomodation prices. April and October are considered the transition season and November through March the low season. However, these criteria are not generalized to all accommodation in Flores Island.

Tourism growth

Recently the Azores have clearly become a tourist destination. The positive performance of tourism in the Azores (in some years counteracting the trend in many regions of the country) indicates the emergence of alternative destinations where natural, cultural and environmental preservation make a difference, and also the marketing success of the Azores islands in various target markets.

However, the number of tourists recorded for Flores Island is far from what can be considered mass tourism. Nevertheless, the Tourism Management Entities of the Azores

are set on controlling the number of visitors taking into account the capacity of each island. In this sense, the POTRAA indicates the need for slowing down the pace of growth in recent years to levels between 5.5 and 6.5% per year (average) assuming a growth in demand between 8.5 and 9.5% per year (average) in view of the need to sustain and improve the rates of bed occupancy.

In 2007 Flores, Graciosa, Pico and São Miguel Islands showed a homologous cumulative decline of such rates, respectively 21.7%, 13.8%, 10.0% and 1.3%.

Tourism development potential

Flores Island can be especially attractive for certain market segments, particularly those that priviledge hidden and unexploited locations and for amateur and professional nature lovers. It is thus not surprising that the Azores are marketed as "the magic of nature" often illustrated with images from Flores Island (**Figure 47**). This island has surely a high tourism potential, however requiring low levels of occupancy and its controlled use.

Some of the main characteristics of Flores Island that increase its tourism potential as a Biosphere Reserve are:

- Quality and diversity of its natural patrimony (biological and geological);
- Landscapes (rural, agricultural, forestry, cultural and natural - Natura 2000 reserves);
- Production of high quality agricultural products of cultural tradition;
- Architectural, historical and cultural patrimony;
- Geographical location, climate and other characteristics that are highly valued by small scale nature tourism;
- Authentic and diverse cultural events (traditional popular festivals) highly attractive for cultural tourism;
- Original ethnographic patrimony;
- Geographically suitable for trecking;
- Good housing conditions;
- Implemented environmental policy;
- Defined Municipal Director Plans.

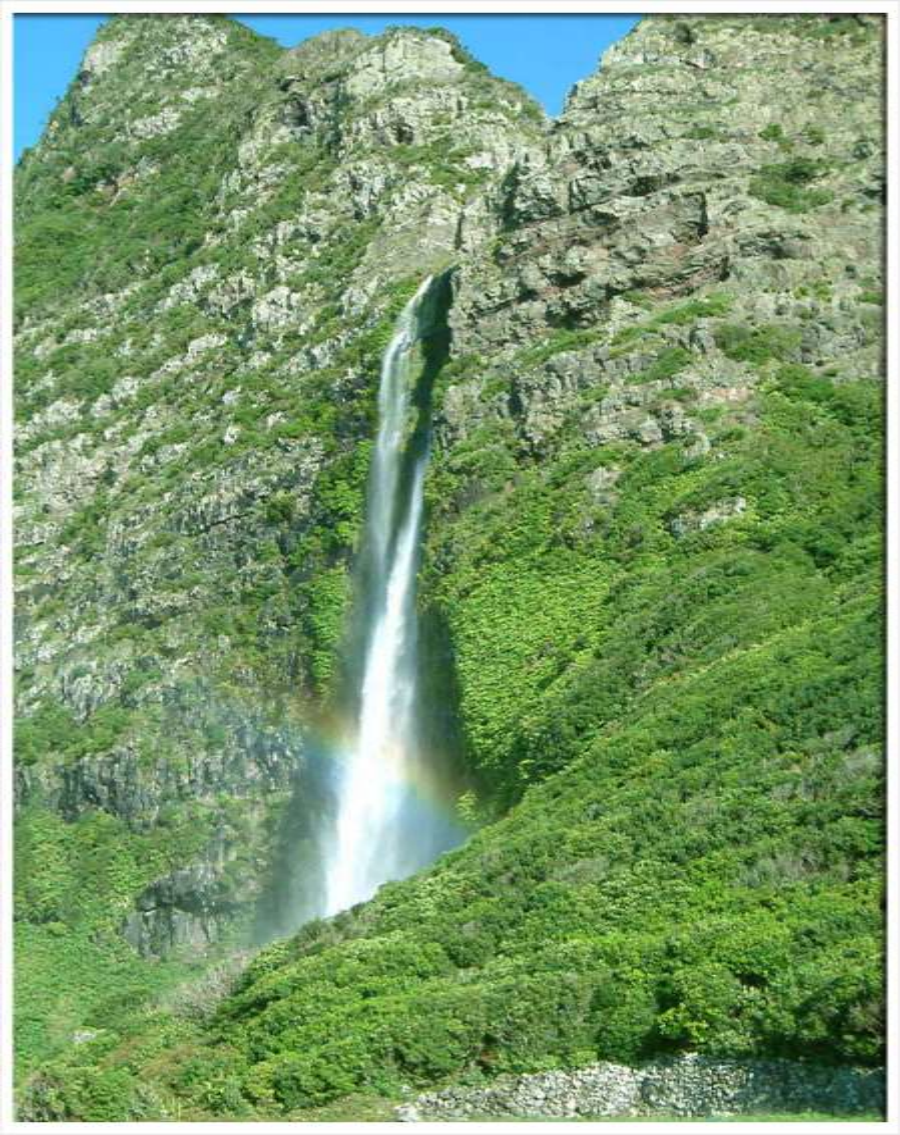


Figure 47. Waterfall in Poço do Bacalhau.

Although there is still much to do in terms of tourism animation, local festivities by themselves attract tourism, as is the case of the Holy Spirit "Impérios". The population of the Azores, compared to other European populations, can be considered the one that most strongly and genuinely express its cultural roots, though probably in an unconscious way. Activities in this area should focus on genuine local traditions, instead of enhancing other undifferentiated activities that can be found anywhere else.

It is crucial to support the qualification, infrastructures and improvement of areas that are specially suited for active tourism like trecking, birdwatching, diving, kayaking (at sea and lakes), horseback riding, paragliding, canyoning, etc., while ensuring the protection of natural values of the areas concerned. Innovation is also of great importante. The creation of a "Water Route" is a good example – a thematic tour passing

by various natural elements and structures associated with water, namely waterfalls, lakes, streams and water mills, some of which are still in operation.

The observation of cetaceans, increasingly popular on other islands of the archipelago, could also develop in Flores Island establishing a connection with the memory of whaling and benefiting from future facilities such as the Interpretation Center of the Whale Factory of Boqueirão. The Azores archipelago is the place in the northeast Atlantic whith the highest occurrence of cetaceans. Over 24 species of whales and dolphins have been observed around these islands. Whale watching has been growing in the Azores and is currently an important part of the Region's tourism and economy. To preserve such patrimony rules were set to define good practice of this activity (DLR No 9/99/A, of March 22, amended by the DLR No. 10/2003/A, of March 22).

Nautical tourism has also been gaining strength on Flores Island, particularly diving, and so far there is only one company operating in this area, as a parallel activity to traditional housing.

Birdwatching is another recent fast growing tourism activity in Flores Island triggered mainly by the presence of neartic bird species during the month of October. This activity has great advantage because it attracts environmentally aware tourists in October, thus increasing tourism outside the high season. There is currently a shelter for bird-watchers in Lagoa Branca (**Figure 48**).

There are other tourism activities with high sustainable development potential, such as canyoning. Flores is considered by the local adventure sports association (Associação de Desportos de Aventura Desnível) as the island with highest canyoning potential because of its abundance and diversity of routes and imponent landscape.

Tourism planning

As a tourist destination the Azores are particularly suited for nature tourism (scientific and active) since its success depends largely on its natural resources. Regulation on nature tourism in the Azores exists since 2004 by Regional Legislative Decree adopting the existing national legislation with some adjustments. Despite the important progress in urban planning, landscape in the Azores is still highly rural and natural, thus perfectly appropriate for nature tourism. Consequentlty, the scope of this legislation was extended beyond the limits of protected areas in the Azores, most of them small.

According to this legislation "the concept of nature tourism has gained and will certainly continue having central importance in the marketing, of institutional or any

other nature, of the Azores as a tourist destination, that result directly from the consensual recognition that this region's main and most appealing tourism resource is undoubtedly a seducing landscape".

Figure 48. Shelter for bird-watchers in Lagoa Branca.

According to the same legislation, the regional tourism and environment Governmental departments shall boost the dissemination of information on nature tourism and provide technical support for licensing construction and use, and for environmental activities.

In this context several initiatives were undertaken to promote the development of nature tourism, particularly in terms of tourism legislation and promotion. Specific legislation for the Azores was created, namely:

- Regional Legislative Decree No. 34/2004/A, of August 27: applies to the Azores the Decree-Law No. 47/99, of February 16, amended and republished in the Decree No. 56/2002, of March 11, which regulates nature tourism.

- Regional Legislative Decree No. 16/2004/A - legal regime of classified walking trails of the Azores;
- Regional Legislative Decree No 9/99/A - Observation of cetaceans.

Given the potential for nature exploitation in the region, the tourism promotion programme of the Azores has focused on markets with a particular interest in nature tourism, ecotourism and active tourism. The promotion strategy sought to raise awareness in European countries with greater interest for this type of tourism, especially northern countries that are less seasonal. Canada, the United States and mainland Portugal have also contributed to an increased tourist flow to the Azores.

Currently there are direct flights from the Azores to Lisbon, Oporto, Funchal, Scandinavian countries, United Kingdom, Ireland, Germany, Netherlands, Austria, Spain, U.S.A. and Canada, and starting this year to France and Italy. The lower air fares set by local Government policy and a strong bet on promotion allowed diversification of air routes to new destinations. Accomodation supply has duplicated in recent years as a consequence of increased confidence in this sector, drawn by incentives provided by the Regional Government. Investments were made essentially for the renovation of existing facilities or for the construction of new three and four star units, or rural tourism units, thus providing a high quality tourist accommodation supply.

A degree in ecotourism has started to be thaught at the University of the Azores since 2005/2006, as a response to a growing sector in the Region. The degree aims to provide a general training in tourism simultaneously specializing in nature, rural, and cultural patrimony oriented tourism.

Additionally the exploitation of the natural and geological patrimony of these islands is likely to constitute an important resource for "scientific tourism" in the Azores. In terms of natural and geological characteristics the Azores islands complement each other and confer great geological diversity to the archipelago. This creates enormous potential for the enrichment of traditional landscape tourism with the participation of research teams of recognized merit. Flores Island is undoubtedly suitable for the developement of scientific and nature tourism (**Figure 49**).

Currently, there is a plan for the tourism sector - the Tourism Planning Act for the Autonomous Region of the Azores (POTRAA) - whose overall aim is the "development and establishment of a sustainable tourism sector, which ensures economic development, the preservation of natural and human environment, contributes to the island's territorial planning development and mitigates the disparities between different areas of the region". This sectoral plan sets constraints to the location and type of tourism

enterprises, while safeguarding and preserving the natural and cultural patrimony of the Azores, and guiding the development of tourism in the medium and long term. Overall, the POTRAA aims for the development of 'destination Azores' based on its quality tourism potential, without environmental degradation.

Figure 49. Geological formations within Lagoa Negra.

The main development guidelines for tourism defined in the Tourism Sector Plan specifically for Flores Island are: landscape diversity; community; rest; diving; trecking. The uniqueness of Flores is also to be enhanced and the connection to Corvo strengthened (**Figure 50**). The diversity and originality of the tourism resources of Flores Island are considered a strategic strenth.

In this context, the Government has also bet on creating museums in order to promote quality tourism and cultural development. The former whale factory of Boqueirão is currently being adapted to become a Center for Environmental Interpretation and Cultural of Boqueirão, intended to be a scientific/cultural place that highlights the strong connection of the local population with the sea. It is also supposed to provide visitors with information about marine habitats and associated fauna in Flores Island, and how to observe them in nature. Similarly, the Agricultural Museum in Fajã

Grande and the Dairy Museum in Lajes and other buildings of the kind are being rebuilt in various parishes of the island, to display traditional activities and ways of life in Flores Island.

Figure 50. Corvo Island viewed from Flores.

According to POTRAA a target number of 16500 beds was set for the archipelago, with and extension possibility of 10% (1650 beds), totalizing 18150 beds. Accordingly, the distribution proposal for Flores is of 578 beds in 2015, which represents 3.5% of the total for the archipelago, compared to 203 beds in April 2005 (2.4%).

Accessibility and transport

The most usual way to to reach the Azores is by plane to Ponta Delgada (São Miguel), Lajes (Terceira) and Horta (Faial Island). To connect Europe and other continents there are daily flights via Lisbon, regular flights to Madeira, the U.S. and Canada and charter flights to northern European countries, the U.S. and Canada. All islands are connected by sea from May to October by the ferry company AtlânticoLine. Faial, Pico and São George Islands are connected throughout the year with regular ferrys operated by Transmaçor and Expresso do Triângulo. There are no passenger ships arriving in the Azores from abroad. However, because of its excelent geographical

location, the harbours of the Azores are visited by yachts and cruise ships crossing over the Atlantic Ocean.

Flores Island is equipped with one airport with an asphalt runway of 1400m in length and 30m width. There are direct flights to and from Corvo, Horta, Terceira and São Miguel operated by the regional airline SATA - Air Azores. Flights are scheduled seasonally, and currently there are daily flights to and from Flores Island, except on Sundays during the winter.

There aro no regular passenger boats during the winter, but in the summer (from June to September) there are weekly ferries to the other islands operated by AtlânticoLine. Between Flores and Corvo there are boats that connect the two islands (15 miles distance) in one hour. Connections are irregular during the winter, but in the summer these boats can make several trips a day, however not on a regular basis, depending on the number of passengers and conditions of the sea. The Government has recently provided a boat (currently in its final construction stage) for passenger transport between Corvo and Flores Islands to ensure greater connection between the two islands.

14.2.1 Type(s) of tourism

Flores Island presents excellent conditions for the practice of tourism in several aspects, such as climatic conditions, geography and natural patrimony. The most common practices of tourism (though little expressive in quantitative terms) are: bathing tourism, cultural tourism, nature tourism, ecotourism and adventure tourism:

- Bathing tourism – visiting places with natural or man-made bathing infra-structures and good weather conditions (many hours of sun, reduced rainfall and high/medium temperatures) for outdoor leisure activities.
- Cultural tourism – usually praticed by outsiders of the local community interested in historical, artistic and scientific aspects or the lifestyle/patrimony of a certain community, region, group or institution;
- Nature tourism – visiting areas that are rich in natural patrimony, with the purpose of admiring the scenic landscapes, as well as to take part in cultural, agricultural and sporting activities;
- Ecotourism – visiting natural areas with the single objective of appreciating, studying and enjoying its beauty, wildlife and natural specificities;

- Adventure – open air leisure activities performed in exotic, remote or wild places, highly active and with great involvement of the participants, inspired by extreme/radical sports in the second half of the XX century.

There are several walking trails, duly marked to allow close contact with nature.

Bathing activities are possible in natural coastal pools, beaches (though some of pebbles and in remote places) and small pools at the bottom of waterfalls in coastal areas and "fajãs".

The sea also provides support for the practice of water sports like fishing, sailing, windsurfing, kayaking (also possible in lakes) and other activities such as boat trips around the island or to Corvo Island, and observation of marine animals.

Fishing (both offshore and coastal) is highly attractive in the Azores due to a great variety and abundance of fish in these waters. Freshwater species are also available in lakes and streams (trout, perch, carp, pike and large mouth bass). Starting from the summer of 2008 tourists visiting the Azores have the opportunity to participate in commercial fishery activities for self-consumption of the fish caught. Legal framework for fishing-tourism was recently approved by the regional parliament for the Azores subarea of the Portuguese Exclusive Economic Zone (EEZ). Fishing-tourism is defined as "the supply of nautical tourism services of cultural nature, fishing and complementary activities" and can be carried out by licensed nautical tourism entities using registered vessels and licensed gear for commercial fishing. This legislation is supposed to increase income in the fishing industry and simultaneously broaden tourism supply while allowing tourists to experience genuine cultural traditions of the fishing communities.

Hunting is also a possibility in Flores Island because of highly abundant populations of rabbits.

Bird-watchers are attracted to Flores Island by the possibility of seeing a variety of seabirds including the stern, the Cory's shearwater and a variety of seagulls and some rare birds, especially in October.

The pratice of canyoning is potenciated by the abundance of streams and waterfalls, and paragliding by the island's topography.

The most important cultural patrimony is sacattered throughout the various parish churches, the Holy Spirit "Impérios" and the Ethnographic Museum (**Figure 51**). Centers for Environmental and Cultural Interpretation and small museums to illustrate traditional and ongoing local activities will be available in the near future.

Figure 51. Interior of the Ethnographic Museum.

Places of interest

Rocha dos Bordões: the geological ex-libris of Flores Island, has high scenic and geological value. It is a geological formation, characterized by large basaltic columns (lava subject to prismatic disjunction in the cooling process) exposed by erosion. It is classified as Natural Monument Regional;

Morro Alto: the highest point of the island (914m) provides a panoramic view of lakes, green valleys and small streams;

Pico dos Sete Pés, Marcela and Burrinha;

The seven lakes in the central area of the island: Lagoas Funda, Branca, Seca, Rasa, Comprida, da Lomba and Funda das Lajes;

Waterfalls: there are about 20 between Fajãzinha and Ponta da Fajã; the highest is in Ribeira Grande;

Poço do Bacalhau: 90m high waterfall forming a pond surrounded by natural and endemic vegetation. Because of its easy pedestrian access, it is used as a bathing area;

Lagoa das Patas (or poço da Alagoinha): it is an extremely scenic lake surrounded by vegetation and waterfalls (**Figure 52**) that can be reached through a short walking trail;

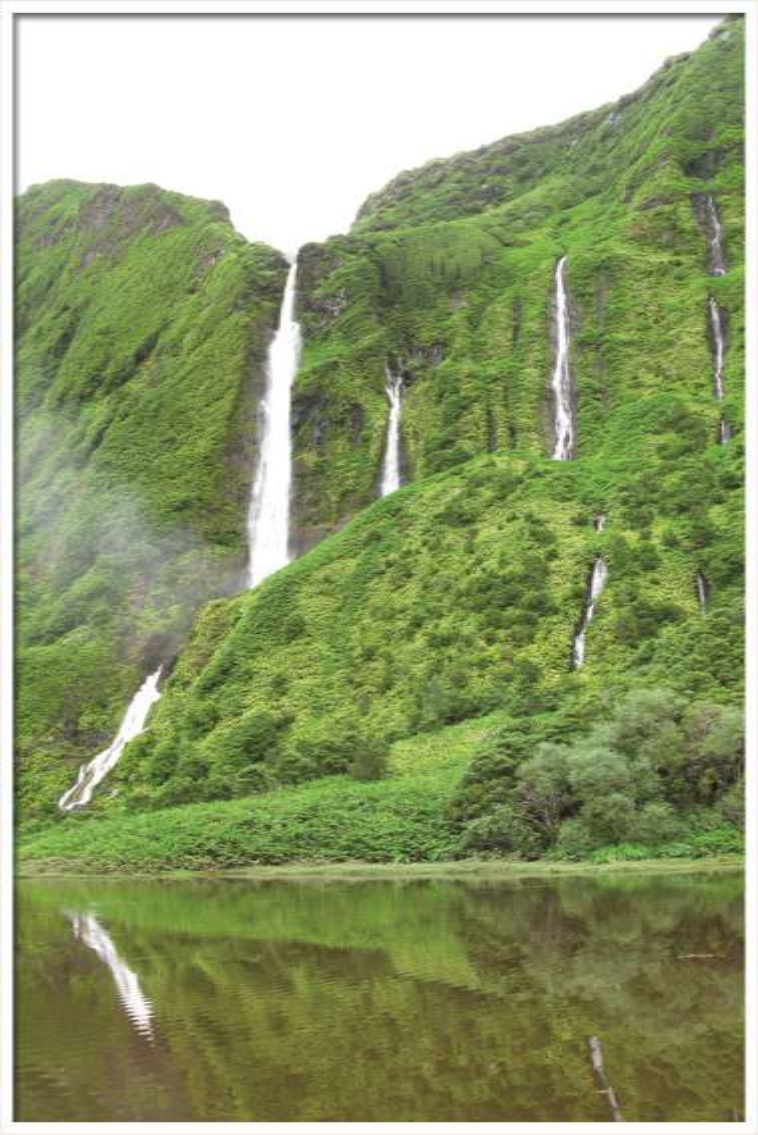


Figure 52. Lagoa das Patas with waterfall.

Pedras do Frade e da Freira: eroded rocks that resemble the forms of a monk and a nun;

Gruta do Galo: its name was inspired by the apparent profile of a rooster carved in the rock. Interesting geological formations can be viewed there, namely its entrance that resembles a cathedral;

Islets: there are several islets along the whole coastline that are of scenic importance; the Islet of Monchique constitutes the westernmost tip of Europe;

Gruta dos enxaréus: a 50m long and 25m wide intertidal cave located between Santa Cruz and Caveira;

Cliff of Rocha Alta: provides a view of the coast in an area of many islets;

Baía de Alagoa: a scenic bay crowded with islets and submerged banks;

Bathing areas: in Santa Cruz and Fajã Grande there are good natural swimming-pools and in Lajes there is a sandy beach;

The former Vigia da Baleia: located in Fajã Grande, it offers a view of Fajã Grande and Ponta da Fajã and adjacent sea;

Several parish churches: these hosts important items of religious art and valuable carved wood work and are representative of the religious architecture in the Azores;

Viewpoints: there are plenty viewpoints over the "fajãs" and the sea where it is possible to admire the coastline; breathtaking scenery that includes lakes, extinct volcano craters, waterfalls, water springs and cultivated fields in a peacefull and unpolluted environment;

Lajes: a picturesque village surrounded by green fields and monuments, of which stand out the church of Nossa Senhora do Rosário built in the XVIII century and the chapel of Nossa Senhora das Angústias built by noble Spaniards rescued from a wreck;

Village of Coada: this is the only set of classified buildings in Flores Island (Resolution No. 102/2000, of July 6). The classification was based on its historical, architectural and landscape interest. It is representative of a formal agriculture related architecture, and currently one of the most successful projects of rural tourism in Flores Island. After the gradual depopulation of this village, its ruins started being restored at the end of the 1980s and are currently used solely for tourism. Lugar da Caldeira (between Mosteiro and Fajãzinha) could have the same fate if the will and initiative of its current owners would allow it;

Santa Cruz: its imponent buildings are a reflex of the prosperity in this pretty town. Baroque architecture buildings can be found here, such as the São Boaventura, that now host the Museum of Flores (**Figure 53**);

Ethnographic museum of Flowers: convent and church of São Boaventura were donated by father Inácio Coelho in 1641. The Franciscans remained there until the advent of liberalism. In 1873 it was bought by António Vicente Peixoto Pimentel and donated to the Santa Casa da Misericordia de Santa Cruz das Flores to host a hospital and asylum for poor children. It remained so until the end of the 1960s, when it was adapted to become a school, and finally restored in 1993 to become the Museum of Flores. The ethnographic museum displays a collection of objects from the everyday life of the local population in its various activities, highlighting facts and names of the history of Flores Island. This collection is essentially ethnographic and covers the peridod XVIII-XX. Reflecting the shipping and whaling activities, a significant scrimshaw collection displays pictures and objects made of sperm whale bone and teeth made by American

whalers and artisans from the Azores and other regions. Agriculture and livestock exploitation are also illustrated by a range of gear used to work the land and for the local products (mainly dyes, cereals, legumes, tubers and flax). The museum has also a significan collection of wool and flax spinning and weaving tools, and textiles produced locally, namely bedspreads, blankets, towels and clothing. Religious art can be found in the church and vestry. Also belonging to the Museum of Flores is the seventeenth century Museum House Pimentel de Mesquita, where the last Captain of Flores, João Peixoto da Silveira, lived;

Figure 53. Façade of the Convent/Museum.

Fajãzinha: surrounded by the sea, where picturesque ruins of former watermills and the church of Nossa Senhora dos Remédios can be found involved in the constant whisper of the 300m high waterfall of Ribeira Grande (**Figure 54**);

Holy Spirit "Impérios" and **chapels** that thrive throughout the landscape symbolizing devotion are unique examples of architectural adaptations from European aesthetic trends in an island isolated for centuries.

Figure 54. Landscape of Fajãzinha.

Figure 55. Cuada village.

14.2.2. Tourist facilities and description of where these are located and in which zone of the proposed biosphere reserve

In 2007 there were about 20 tourist accommodation facilities (**Table 5**): three traditional hotels, with an annual occupancy rate of 13.7%; one rural tourist accommodation facility, with an annual occupancy rate of 1.3%; eight guest houses with an annual occupancy rate of 9.7% and eight private houses. In total these facilities have an accommodation capacity for 348 people, and an average number of 32 employees. Additionally there is a campsite in Fajã Grande and some private rooms and houses are available during the summer months when the turnout increases significantly (**Figure 55**).

There are about thirty restaurants/snack-bars, although some of them only serve light meals or one single dish per day. Even the restaurants with "à la carte" menus have a limited supply of fish and meat dishes (fried, grilled or stewed). There are also three main nightclubs.

The scarce supply is mainly due to the small and seasonal number of visitors concentrated in three months during the year, which makes investment unattractive. Tourism supply is still poorly differentiated because this activity has just started to expand and develop.

14.2.3. Indicate positive and/or negative impacts of tourism at present or foreseen

Natural resources of the Azores islands make up its added value as a "tourism product" which justifies the Government's careful planning of tourism development. Planning should thus be integrated, pro-active and strategic to avoid possible negative impacts of this activity. It should take into account the basic principles of sustainable development, allowing present generations to meet their needs without jeopardising those of future generations.

Sustainability of tourism is drawing increasing attention due to the impact of this activity's development on the local population. The core concept of sustainability recognizes both positive and negative impacts of tourism on local communities, thus requiring that management and planning of this sector must take into account how tourism develops locally and how local communities adapt to this development. In this context the Regional Office of Statistics of the Azores (SREA) held in 2005 a "Study on the attitudes of residents towards tourism in the Azores" under a project SIET-MAC

(System of Indicators for Sustainable Tourism Macaronesia) with the specific purpose of obtaining information related to indicators of a cultural and social impact of tourism.

Table 5. Existing infrastructures.

Parish	Type	Infrastructure
Fajã Grande	Housing	Private housing "Argonauta"
		Village tourism "Aldeia da Cuada"
	Restoration	Coffeeshop/Snack-Bar "Costa Ocidental"
		Restaurant "Casa da Vigia"
		Restaurant/Terrace "Zona Balnear"
	Bathing areas	Natural swimmingpools
		Old harbour
		New harbour
	Patrimony	São José church (Fajã Grande)
		Nossa Senhora do Carmo church (Ponta da Fajã)
	Walking trails	Fajã Grande – Lajedo (PR2 FLO)
		Fajã Grande - Ponta do Albarnaz (PR1 FLO)
		Fajã Grande – Miradouro das Lagoas (PR3 FLO)
		Fajã Grande – Antiga Vigia da Baleia
Fajãzinha	Housing	Pension "Paraíso"
	Restoration	Restaurant "Pôr-do-sol"
	Patrimony	Nossa Senhora dos Remédios church
Fazenda das Lajes	Restoration	Coffeeshop/Restaurant "Flores"
		Typical restaurant "O Forno Transmontano"
	Patrimony	Senhor Santo Cristo church
Lajedo	Patrimony	Nossa Senhora dos Milagres church
Lajes das Flores	Housing	Guest house "Pousada das Lajes"
		Tourist appartments and rooms for rent (Telma Silva)
	Restoration	Restaurant "Pousada das Lajes"
		Coffeeshop/Restaurant "Beira Mar"
		Coffeeshop/Snack-bar "Porto Velho"
		Restaurant "Casa do Rei"
	Transports e Communication	Flores Island commercial harbour
	Walking trails	Fajã de Lopo Vaz (PR4 FLO)
	Patrimony	Nossa Senhora do Rosário church
Lomba	Restoration	Coffeeshop "Salão Paroquial"
		Coffeeshop "João Germano de Deus"
	Patrimony	São Caetano church
Mosteiro	Patrimony	Santíssima Trindade church
Caveira	Patrimony	Nossa Senhora do Livramento church
Cedros	Housing	Private housing - Helga Schneider
	Walking trails	Cedros-Alagoa-Cedros
	Bathing areas	Alagoa Park
	Patrimony	Nossa Senhora do Pilar church

Table 5. Existing infrastructures. (cont.)

Parish	Type	Infrastructure
Ponta Delgada	Restoration	Restaurant/Bar "O Pescador"
		Restaurant/Bar "Casa do Povo de P. Delgada"
	Bathing areas	Ponta Delgada harbour
	Patrimony	São Pedro church
Santa Cruz das Flores	Transports e Communication	Flores Island airport
	Housing	"Hotel Ocidental"
		"Hotel Servi-Flor"
		Guest house - António Manes
		Guest house - Malheiros Serpa
		Private housing - José Espírito Santo Alves Melo
		Private housing - Maria de Fátima Avelar
		Private housing - Eva Margarida Elias da Rosa
		Guest house "Vila Flores"
		Guest house "Acquamarina"
		Guest house - Maria Alice Pereira
		Guest house - Telma Silva
	Restoration	Restaurant/Bar - "Hotel Servi-Flor"
		Restaurant/Bar - "Hotel Ocidental"
		Restaurant "Marés Vivas"
		Restaurant/Pizzahouse/Bar "Quatro a Ocidente"
		Restaurant "Sereia"
		Restaurant "Rosa"
		Restaurant "Baleia ocidental"
		Snack-Bar "José de Freitas Braga"
		Bar "Soc. Filarmónica Dr. Armas da Silveira"
		Bar "Boaventura Ramos"
		Bar "Lucino's Bar"
		Bar "G.D. Os Minhocas"
		Bar "Gare do Ocidente"
		Bar "Golfinho"
		Bar "Coffeeshop Gil"
		Bar "Hotel Coffeeshop"
		Bar/ Kiosk/Terrace "BuenaVista Caffé"
		Bar "Quatro a Ocidente-II"
	Rent-a-car	IUR Rent-a-car
		Avis Rent-a-car
	Nautical avtivities	Diving and boat trips "Hotel Ocidental"
	Bathing areas	Natural swimmingpools
		São Pedro harbour
		Boqueirão harbour
	Patrimony	Nossa Senhora da Conceição church (main church of Santa Cruz)
		Nossa Senhora de Lourdes church (Fazenda de Santa Cruz)
		Ethnografic Museum of Flores Island

Expected positive impacts

Boosting tourism in Flores Island will certainly have a multiplier effect in the refreshment of the local economy. Increased private investment in companies and infrastructures will generate more jobs and thus provide conditions that are more attractive for establishing residency, especially young people, thus slowing down the actual ageing of the population. It will also require some accessibility improvements and modernization of infranstructures and services that will benefit also the local population. For example if plane connections increase to meet higher tourism demands, the local population will also benefit from increased regular flights.

Rehabilitation and preservation of the natural and built patrimony that could otherwise be left abandoned for lack of utility and economic resources is also of major importance. Tourism creates the need and the means to intervene in this area.

Tourism is also likely to strengthen and enhance the identity and authenticity of the population of Flores Island (**Figure 56**), since there will be a greater effort to preserve traditions, events and typical artifacts of Flores Island to differentiate its image. Such an example is the recovery of spaces for future thematic museums in several parishes of the island.

Figure 56. Baker with wood-fired oven.

Tourism may also have a positive environmental impact by rasing awareness to the preservation of natural resources. Much of Flores Island's value as a tourism product comes from its nature, and efforts should be made to improve tourism supply by increasing landscape quality in terms of flora and fauna diversity. The environmental quality of the island is thus preserved while contributing to the recovery and qualification of "destination" Flores (**Figure 57**).

The following table summarizes the positive impacts of tourism in the regional economy and in promoting environmental and social sustainability.

Environmental	Social-cultural	Economic
Direct economic benefits that can be reinvested in conservation projects; Encouragement to the observation, study and research of the island's natural patrimony; Reconignition of the natural patrimony's value by the local population, causing greater concern for its preservation; Environmental education.	Direct economic benefits that can be reinvested in projects of cultural patrimony restoration and promotion of traditional cultural activities; Fixation and stabilisation of the resident population through job creation in rural activities; Recovery of the cultural identity of the island, raising the interest in rural communities for the preservation and enhancement of the social-cultural patrimony; Recovery of degraded patrimony for sustainable tourism use; Revitalization of regional arts and crafts, contributing to its perpetuation; Greater openness in local attitudes, as a result of increasing cultural diversity of visitors.	Direct economic benefits resulting from the promotion of tourism and expected multiplier effects; Enhancement of agricultural biological production with the participation of tourists; Development of sustainable activities, with tangible benefits to the local community (e.g. creating jobs and stimulating private sector activities); Creation of alternative employment to environmentally destructive economic activities, particularly livestock farming.

Expected negative impacts

Flores Island's handicapped accessibility has posed difficulty to its economic expansion, but simultaneously has also limited the effects of external aggressions. In recent years, however, there has been a set of faster transforming processes that combined with new social and economic dynamics influence landscape and are the source of major problems: loss of population and change of its spatial distribution; increased pasture area; disorganized urban expansion; poor integration of construction in the landscape; abandonment of cultivation areas and consequent degradation of traditional systems and respective built and cultural patrimony; difficult conjunction of legislation with increased tourism management and the risk of pressure on certain areas.

Figure 57. View to Fajãs on the west coast.

No significant negative impacts are expected from tourism, as this activity is highly planned and regulated, particularly with regard to the use of natural resources, and although growing fast is is not expected to reach very high values in the medium term. However, there is a risk of fragilizing the island's oconomy by creating a large dependence on this sector. There is also the possibility of "over-investment" in tourism that can lead to low profitability uncertain businesses, which constitute a waste of capital.

Seasonality may become the basis of precarious jobs that increase public expenditure in unemployment benefits during most of the year, and also reduce attractiveness for specialized workforce, leading to bad customer service. Tourism is crucial as a lever for the recovery and conservation of nature and as a source of employment opportunities and added value of local production (**Figure 58**) however it should not become the pillar of economic activity in Flores Island, since it depends on many exogenous factors.

Figure 58. Lajedo.

Bad or excessive use of resources and lack of supervision and awareness rising, could lead to the environmental degradation of some locations.

Aesthetic and technical quality of construction of tourism facilities in coastal areas or other high-value scenic areas could adulterate landscape, and possibly lead to the loss of habitats and native species.

Moreover, nautical activities such as spearfishing and recreational fishing may lead to over-exploitation of resources, disturb marine birds, cause the abandonment of their nesting territory, reduce populations of some important species, and/or reduce food availability for breeding seabirds.

To avoid the negative impacts of tourism the main problems have been identified through the Tourism Planning Act for the Autonomous Region of the Azores, the Sectorial Plan of Natura 2000 and the Regional Territorial Planning Act. Maintaining the quality of the natural areas in the future is crucial, since it is the main competitive advantage of the tourism industry in Flores Island. The development of tourism in the proposed Biosphere Reserve will take into account its possible negative impacts in order to minimize them.

14.3. BENEFITS OF ECONOMIC ACTIVITIES TO LOCAL PEOPLE

Besides beef, cheese, crafts and ethnography in general, natural resources and historical and cultural patrimony can also be considered as economic resources of Flores Island (**Figure 59**). Even in economic terms it is essential to preserve such resources – this will ensure their potential through an increase in their competitive value and therefore raise profit generated by tourism. All these factors will lead to increased investment in the island, while its classification as a Biosphere Reserve will promote its potential and project it internationally.

Figure 59. Local craft.

Balanced natural ecosystems, either directly or indirectly, improve the lives of people through various forms: resources (food, water, primary products); mitigation of pollution; protection of catastrophic events; and development of economic activities. The regional Governmnent with its coherent environmental policy has brought many benefits to the Azores, which reflect on the Region's positive image in terms of landscape, nature and biodiversity.

Betting on nature tourism has a positive economic value in the sense that it attracts tourists with special interest in nature and traditional customs, thus favouring the

recovery of secular traditions of high social-cultural value. Additionally it also adds environmental value by increasing monitoring and conservation of natural areas.

15. LOGISTICAL SUPPORT FUNCTION

15.1. RESEARCH AND MONITORING

15.1.1. To what extent has the past and planned research and monitoring programme been designed to address specific management questions in the potential biosphere reserve?

Recent research focusing on diverse fields of expertise in Flores Island has provided deep knowledge on local habitats and species. To reward this effort, the Government promoted systematic and objective surveys on available data and evidence. In this context the Natura 2000 Sectorial Plan for the Azores was created as a global instrument to support management of SCIs and SPAs. This plan sets the scope and legal framework for the preservation of habitats and species of wild fauna and flora required by the existing natural values, while taking into account the economic and social development of the covered areas.

Recently the Government submitted the draft Regional Legislative Decree for approval in the Legislative Assembly to create and implement the Natural Park of Flores Island as a management tool for the protected areas of Flores Island within the Regional Network of Protected Areas of the Azores, created by the Regional Legislative Decree No. 15/2007/A, of June 25.

In socio-cultural level, is to highlight the knowledge gained by the research and development of written and photographic works by historians, photographers and architects.

15.1.2. Brief description of past research and/or monitoring activities

Flores Island and its unique natural patrimony have attracted for long the interest of resident and/or visiting researchers. The first studies consisted mainly of data collection in sporadic or occasional visits to the island. The appearance of the University of the Azores (1976) allowed the settling of researchers in the archipelago and further development of research on these islands in the second half of the XX century.

The University of the Azores congregates specialized researchers, scientific equipment and facilities in its departments on São Miguel, Terceira and Faial Islands that, and has been involved in the development and coordination of regional, national and international projects of regional interest while promoting knowledge exchange and training. The initial occasional and disarticulated studies have thus evolved towards integrated multidisciplinary research projects.

Various research studies and programs on Flores Island have focused on diverse topics, namely on the biology and ecology of organisms; on the characterization of populations, communities and systems and on geomorphological, hydrological, volcanological, climatic, demographic, social-economic and cultural aspects, among others. The Government has put special emphasis on territory management and protection of natural resources, namely through the development of programmes like: the Regional Network of Protected Areas of the Azores (RRAP), the Sustainable Development Regional Plan for the Autonomous Region of the Azores (PReDSA), Center for Processing and Organic Waste Recovery of Flores Island within the Strategic Plan for Waste Management in the Azores (PEGRA), Natura 2000 Management Plans - terrestrial and marine areas, Natural Park of Flores Island (PNI of Flores Island), Coastal Management Plan (POOC) of Flores Island, Regional Territorial Planning Act for the Azores (PROTA), some of which are still undergoing approval.

Recent research/monitoring projects developed on Flores Island worth highlighting:

- 1995-1998 - project "*Conservação das comunidades e habitats de aves marinhas dos Açores*" within the scope of LIFE Nature Programme, coordinated by Oceanography and Fisheries Department of the University of the Azores in partnership with the Regional Directorate of Environment, University of Glasgow and Royal Society for the Protection of Birds (RSPB). Research focused on the biology and ecology of seabirds in the Azores and allowed the setting of conservation priorities and ensured monitoring of their distribution and population trends.
- 1995-1999 - project "*Flora litoral das Ilhas das Flores e Corvo: Inventário, ecologia e afinidades biogeográficas*", coordinated by the Marine Biology Section/Biology Department of the University of the Azores in partnership with the Regional Tourism and Environment Secretariat/Regional Directorate of Environment. Research focused on the taxonomy and ecology of the coastal flora of the island.
- 1997-2000 - project "*AMIR - Aves Marinhas como Indicadores de Recursos e da Estrutura da Teia Alimentar na Região dos Açores*" coordinated by the Sea

Institute (IMAR) of the Oceanography and Fisheries Department of the University of the Azores. Research focused on the feeding ecology of Cory's shearwater (*Calonectris diomedea borealis*), common stern (*Sterna hirundo*) and pink stern (*Sterna dougallii*) in the SPA.

- Several recent campaigns for the collection of geological and seismological data to improve the geomorphologial characterization of the island.
- 1998-2000 - project "*COGEAM - Controlo geodinâmico nos Arquipélagos dos Açores e da Madeira utilizando estações permanentes GPS*" coordinated by the Science Faculty of Lisbon University. Research focused on the application of techniques of space geodesy (e.g. GPS - Global Positioning System) for controling deformation of the earth crust and determining shifts between tectonic plates, with the aim of installing a GPS receiver at the airport of Santa Cruz das Flores.
- 1998-2003 – project "*MARÉ - Gestão integrada de zonas costeiras e marinhas dos Açores*", within the scope of LIFE Nature Programme, coordinated by the Oceanography and Fisheries Department of the University of the Azores in partnership with the Regional Directorate of Environment, the Regional Directorate of Fisheries and IMAR. Definition of Integrated Management Plans for Natura 2000 Marine and Coastal Zones of the Azores. The Management Plan for the Special Protection Area *Costa das Flores* was defined and management tools set to safeguard the conservation of Natura 2000 protected wildlife and natural habitats.
- 1999-2002 - project "*Novo Atlas das Aves que Nidificam em Portugal*" coordinated by the Nature Conservation Institute (ICN), the Portuguese Society for the Study of Birds (SPEA), the Regional Directorate of Environment of the Azores and the Natural Park of Madeira. Bird census on Flores Island.
- 2000-2006 - project "*LITOSOST - Gestão Sustentável do Desenvolvimento Social, Económico e Ecológico das Áreas Litorais da Macaronésia*", coordinated by the Regional Secretariat of Environment and Sea/Regional Directorate of Planning and Water Management (DROTRH) in collaboration with the General Directorate of Spatial Planning of the Autonomous Government of the Canary Islands and the Regional Secretariat of Social Equipment and Transport of the Government of the Autonomous Region of Madeira, within the programme INTERREG IIIB. Initiative of the competent authorities of Macaronesia with the aim of setting coastal area management practices that reduce urban pressure

and infrastructures in coastal areas and regenerate, recover and prepare it for public use.

- 2001-2004 – project "*OGAMP - Ordenamento e Gestão de Áreas Marinhas Protegidas*", within the scope of programme INTERREG IIIB (MAC/4.2/A2), coordinated by the Oceanography and Fisheries Department of the University of the Azores. Definition of draft Natura 2000 Coastal and Marine Management Plans for the Azores. It included a biotic, abiotic and social-economic characterization of the selected sites and the development of an environmental awareness raising programme consistent with the objectives of the project.
- 2002 - "*Caracterização dos territórios mais apropriados para a conservação das populações de aves selvagens do Anexo I da Directiva Aves no Arquipélago dos Açores*", coordinated by the Portuguese Society for the Study of Birds (SPEA), which resulted in the revision of the mapping of the SPA's Network.
- 2004-2007 – Project "*MARMAC - Conhecimento, promoção e valorização para a utilização sustentada de áreas marinhas protegidas da Macaronésia*", within the scope of programme INTERREG IIIB. Valorization of the coastal and marine environment of the Macaronesian Region through the coastal planning, improved management and knowledge on biodiversity in the archipelagos of the Azores and the Canary Islands.
- Since 2004 - project "*CLIMAAT - Clima e metereologia dos arquipélagos atlânticos*", within the scope of programme INTERREG IIIB (MAC/2.3/A3), coordinated by the Centre of Meteorology, Climate and Global Change of the University of the Azores. Scientific cooperation for the development of methodologies for the study of weather and climate of Atlantic islands and their surrounding, and the collection, compilation and processing of relevant climate information and subsequent dissemination.
- 2007-2009 - Draft REMAx - Network Center for Marine Education of the Azores, coordinated by the Center IMAR the University of the Azores and funded by the Regional Secretariat of Environment and Sea, which aims to implement actions of marine education, precursor of future cooperation between actors and educational society. It aims to be the Education Network of Marine Azores (REMA, www.remazores.info).
- Various LEADER II projects that led to the creation or improvement of environmental infrastructures: walking paths; road signaling of tourism relevant information; recovery of Picada Park and the whale factory of Boqueirão;

Caldeira and Pedras Brancas points of view; creation of a ludoteque; natural swimming pools; Alagoa Park.

Scientific Expeditions:

- "FLORES/89", organized by the Biology Department of the University of the Azores. It gathered a considerable number of national and foreign researchers, technicians and students on Flores Island for the period July 4-11, 1989, and focused on biology and geography studies of this isalnd.
- "FLORES e CORVO/95", co-organised by the Marine Biology Section/Biology Department of the University of the Azores and the Natural History Museum (London) in collaboration with the Earthwatch International. A thorough characterization of the coastal areas of the island was developed during the period July 12-15, 1995.
- Expedition to Flores Island within the fieldwork for the draft proposal of the Coastal Management Plan, organised by the Volcanology and Geological Hazard Evaluation Centre/Volcanological and Seismological Observatory of the University of the Azores.
- "FLORES/2007", organized by the Biology Department of the University of the Azores. It gathered a considerable number of national and foreign researchers Flores Island in July 2007, and focused on biology and geography studies of this isalnd.

In terms of research in the socio-cultural activity, there are an assortment of books and photographs, on the Azores archipelago, and specifically on the island of Flores. The works of Gaspar Frutuoso, Frei Diogo das Chagas, Padre António Cordeiro, João da Silveira, Padre José Camoes, Pedro da Silveira, Francisco Gomes, Jacinto Monteiro, Pierluigi Bragaglia, José Trigueiro and Antonio Frias Martins, are some of the examples that describe the historical development, the social portrait and the cultural events of Flores. More recently, the Encyclopedia Azorean prepared by different authors and integrated into the Knowledge Centre of the Azores, came allow the online dissemination of the most striking aspects of reality experienced in the Azores through the ages, and a tool for the dissemination of the culture of Azores. They place emphasis on the issues related to cultural, folklore, gastronomy and music, sport and education, government, military and church, agriculture and livestock, hunting and fishing, flora and fauna, environment, geology, seismology and vulcanology, geography, toponymy, architecture and urban planning, economic activities, associations and charities, demography and

migration, history, archeology, genealogy and heraldry, information and communication, language and literature, philosophy, politics, religion, transport, communications and tourism.

In terms of architectural heritage, must mention the work of exhaustive research that resulted in the works "Popular Architecture of the Azores" (Order of Architects) and "Inventory of Heritage Property of the Azores" (Regional Directorate of Culture).

15.1.3. Brief description of on-going research and/or monitoring activities

A set of projects developed in partnership with other regions of Macaronesia within the scope of Programme INTERREG IIIB are currently underway:

- "*TOURMAC II - Senderos Temáticos de la Macaronesia*", implemented in the Azores by ADELIAÇOR in collaboration with the Cabildo Insular de La Palma, Canary Islands. It intends to develop sustainable tourism supply to promote social-economic development without damaging natural resources and patrimony.
- "*BIONATURA - Cooperación y Sinergias para el desarrollo de la red Natura 2000 y la Preservación de la Biodiversidad de la Región Macaronésica*", implemented in the Azores by ARENA, with the support of the Regional Secretariat of Environment and Sea and in collaboration with the General Directorate of Environmental Policy of the Canary Islands Government. It intends to establish methodological bases for planning and management of Natura 2000 in the Macaronesian Region.
- "*GEREMAC - Proyecto global para la consecución de una Gestión sostenible, eficiente y de calidad de los Residuos generados en la región Macaronésica*", coordinated by the General Directorate of Environmental Policy of the Canary Islands Government.
- "*MARMAC II - Conhecimento, promoção e valorização para o uso sustentável dos ecossistemas e da biodiversidade marinha na Macaronésia*", coordinated by the Oceanography and Fisheries Department of the University of the Azores in partnership with the Cabildos of Fuerteventura and La Palma. It intends to promote a network for the interpretation of marine biodiversity in Macaronesia.
- "*CLIMAAT - Clima e metereologia dos arquipélagos atlânticos*", coordinated by the Centre of Meteorology, Climate and Global Change of the University of the

Azores. Underway since 2004, it aims at collecting, compiling and processing of relevant climate information and its subsequent dissemination.

Other activities include:

- Automated monitoring of seismography and temperature of the island;
- Monitoring of ground- and surface water quality (springs, public supply, rivers and lakes);
- Monitoring of stern populations;
- Improving and/or building of infrastructures, such as the road network.

15.1.4. Brief description of planned research and/or monitoring activities

It is expected that research and monitoring programs on Flores Island continue and possibly increase, given the ongoing activities and the importance of this island in the the context of the archipelago and the north Atlantic. Flores Island is an ideal natural laboratory for the implementation of integrated management plans and models. Future studies will continue the work developed by past and ongoing ones, and increase research directly related to the implementation of a Biosphere Reserve, namely at the social-economic and monitoring levels.

The MIT Portugal project "Green Islands" supported by the Regional Government, will collect information on local energy resources, on the way energy is used in the Azores and how it can be used in the future. Starting with São Miguel and Flores Islands and involving other islands around the globe, the objective of this project is to develop new methods to identify sustainable energy low cost solutions using natural resources inherent to each region. It is intended to develop and study the applicability of a strategic plan to make some of the Azores islands energetically autonomous by introducing electric vehicles.

The Government has planned the construction of the Center for Environmental Interpretation and Cultural of Boqueirão to provide a scientific/cultural museum focusing on the connection of the population of Flores Islands the sea. This facility is intended to arouse the interest of visitors to the knowledge of habitats and natural resources, namely to the study of the Oceans.

Regarding social-economic activities the Government has signed a protocol with the Geographic Institute of Spain for the creation of a new Astronomy and Geophysics Station on Flores Island to ensure the inclusion of the Region in the Atlantic Network of

Geodinamics and Space Stations (RAEGE). This network will consist of four Fundamental Geodetics Stations located in Yebes and Canary Islands (Spain), São Miguel and Flores Islands (Azores) that will support studies on astronomy, geodesy and geophysics.

Other improvement or construction activities starting in 2008 include: the marina of Lajes, the Basic School of Lajes das Flores, the Elderly Home of Ponta Delgada (Santa Casa da Misericordia of Ponta Delgada), and the Sports Pavilion of Lajes.

15.1.5. Estimated number of national scientists participating in research within the proposed Biosphere Reserve

Permanently, about 8.

Occasionally, about 30.

15.1.6. Estimated number of foreign scientists participating in research within the proposed Biosphere Reserve

Permanently, about 4.

Occasionally, about 6 to 12.

15.1.7. Estimated number of masters and/or doctoral theses carried out on the proposed Biosphere Reserve each year

Two or three theses are expected per year, considering the existing work and providing that the implementation of a Biosphere Reserve will attract new research interests to Flores Island.

15.1.8. Research station(s) within the proposed Biosphere Reserve

Seismographic data collected at the automatic high-sensitivity station located at Lajes places Flores Island in the Analogic Seismographic Network of the Azores since the 1980s.

The Automatic Meteorological Station of Ponta Delgada (Project CLIMAAT) records daily data on air temperature, relative humidity, wind direction, diffuse solar radiation, global solar radiation, average wind speed, maximum wind speed and accumulated rainfall.

The Meteorological Centre of Aeronautics of Flores, run by the Meteorology Institute, continuously collects and records weather data at the airport of Santa Cruz das

Flores. Three additional weather stations (Boca da Baleia, Fajã Grande and Ponta Delgada) collect and record daily rainfall and other data.

Continuous oceanographic tidal data are collected by tide recorders from the Hydrographic Institute located in the harbour of Santa Cruz das Flores.

15.1.9. Permanent research station(s) outside the proposed Biosphere Reserve

The departments of the University of the Azores located in São Miguel, Terceira and Faial Islands, have several permanent research laboratories and stations, namely:

- CBA - Centro de Biotecnologia dos Açores (Biotechnology Center of the Azores; http://www.angra.uac.pt/biotech). Research areas: animal and vegetable food biotechnology.
- CCPA – Centro de Conservação e Protecção do Ambiente (Environment Protection and Conservation Centre; http://www.db.uac.pt/ccpa/). Research areas: interdisciplinary scientific research and contract work for the promotion of a balanced management of exploited natural resources in the Region; natural history; conservation; environmental impact studies.
- CIBIO, Pólo Açores - Centro de Investigação em Biodiversidade e Recursos Genéticos, Grupo de Biologia Insular e Conservação (Centre for Research on Biodiversity and Genetic Resources, Group of Insular Biology and Conservation; http://cibio.up.pt/main.php?content=groups&id=bioisle). Research areas: molecular and population genetics; phylogeography; population biology; imunogenetics; taxonomy; ecology; ecosystem and landscape conservation and management.
- CIGPT - Centro de Informação Geográfica e Planeamento Territorial (Center for Geographic Information and Spatial Planning; http://www.db.uac.pt/cigpt/). Research areas: geographic information systems, territorial planning and management.
- CIRN - Centro de Investigação de Recursos Naturais (Natural Resources Research Centre; http://www.cirn.uac.pt/). Research areas: biodiversity and conservation; natural products with medical applicability; biological control of pests; insecticide molecules; epidemiology and human genetics.
- CITA-A - Centro de Investigação e Tecnologia Agrária dos Açores (Center for Agricultural Research and Technology of the Azores; http://www.angra.uac.pt/dca/CITAA.asp). Research areas: agricultural science.

- CMMG - Centro do Clima Meteorologia e Mudanças Globais da Universidade dos Açores (Climate, Meteorology and Global Change Center; http://www.climaat.angra.uac.pt/). Research areas: enhancing the geographic positioning of the archipelago in the context of universal climatology by understanding weather patterns on islands, climate characterization with economical and environmental interest, and developing methods and infrastructures to monitor weather conditions (on land and at sea) with appropriate levels of resolution to cope with the interests of different sectors that depend on climate.
- CVARG - Centro de Vulcanologia e Avaliação de Riscos Geológicos (Volcanology and Geological Risk Assessment Centre; http://www.cvarg.azores.gov.pt/Cvarg/). Research areas: development of Earth sciences - prevention and prediction of natural accidents, disasters and calamities, promoting technical and scientific national and international cooperation in Volcanology and associated phenomena, such as volcanic eruptions, earthquakes, steam explosions, toxic gas release, mass movements and tsunamis, among others.
- IMAR-DOP & ISR - Instituto do Mar, Centro do IMAR da Universidade dos Açores (Sea Institute, IMAR Centre of the University of the Azores; http://www.imar.pt/). Research areas: development of marine science and technology in Portugal through the integration of different disciplines and the promotion of scientific cooperation.
- LAMTec - Laboratório de Ambiente Marinho e Tecnologia (Laboratory of Marine Environment and Technology; http://www.lamtec-id.com/). Research areas: renewable energy, operational oceanography, environmental technologies.
- CES-UA - Centro de Estudos Sociais da Universidade dos Açores (Centre for Social Studies of the University of the Azores; http://www1.universia.net/CatalogaXXI/C10052PPESII1/E168579/index.html). Research areas: social sciences, including sociology and demography.

15.1.10. Permanent monitoring plots

Much of the biotic data is not permanently monitored: ground- and surface water quality (springs, public supply, rivers and lakes) is monitored periodically within the scope of a project from the Regional Secretariat of Environment and Sea/Regional Directorate of Planning and Water Resources; and seabird populations are monitored annually in various parts of the island and islets within the scope of the project MARMAC.

There are, however, places in Flores Island where environmental parameters are permanently monitored:

- Ponto da Rede Sismográfica Analógica dos Açores, Lajes (Analogic Seismographic Network) - continuous monitoring seismic activity.
- GPS receiver, airport of Santa Cruz - annual geodynamical control to assess the evolution of volcanic systems and major fractures that cross the region.
- Estação Meteorológica Automática das Lajes das Flores (Projecto CLIMAAT; Automatic Meteorological Station of Ponta Delgada) - daily monitoring of air temperature, relative humidity, wind direction, diffuse solar radiation, global solar radiation, average wind speed, maximum wind speed and rainfall.
- Centro Meteorológico de Aeronáutica das Flores (Meteorological Centre of Aeronautics of Flores), airport of Santa Cruz - continuous monitoring of weather data.
- Weather stations (Boca da Baleia, Fajã Grande and Ponta Delgada) - collecting data for precipitation. Ponta Delgada's weather station also collects and records data on seawater temperature.
- Tide recorder, harbour of Santa Cruz - continuous monitoring of tides.

15.1.11. Research facilities of research station(s)

Laboratory and research facilities in the archipelago are fully equipped to support the ongoing projects and lines of research. In the Region there are libraries and laboratories for chemistry, physics, meteorology, oceanography, ecology, geosciences, microbiology, cellular and molecular biology and genetics. There is also a boat and an oceanographic research vessel operated by the Oceanography and Fisheries Department of the University of the Azores, and computerized databases and geographical information system.

15.1.12. Other facilities

Flores Island does not have accommodation for researchers and/or students short stays. However, it has a good accommodation supply (see 14.2.2) that ensures visitors' comfort. There is a small laboratory in the Ecoteca (see 15.2.2) and one at the premises of the school (Escola EB 2,3/S Padre Maurício de Freitas).

15.1.13. Does the proposed Biosphere Reserve have an Internet connection?

There is widespread access to the internet in Flores Island.

15.2. ENVIRONMENTAL EDUCATION AND PUBLIC AWARENESS

15.2.1. Describe environmental education and public awareness activities, indicating the target group(s)

The Environmental Promotion Office of of the Regional Secretariat of the Environment and Sea actively engages in activities to inform, disseminate, raise awareness, educate and train the population throughout the archipelago regardig environmental matters. The 7th edition of the "Encontros Regionais de Educação Ambiental - EREA" (Regional Meetings of Environmental Education) was held in Flores in the period of June 3-5, 2004 and is a good example of such initiative. These meetings are a priviledged meeting and training spot for local environmental education officers, and greatly contribute to the environmental awareness, knowledge and education that favour a sustainable development of the Azores archipelago. The Regional Secretariat of Environment and Sea also aimed to raise population awareness on local environmental issues through the programme Ecobrigadas 2007 (Ecobrigades) – young people informed and trained the population on all islands, except for Corvo, to encourage good environmental practices. The Eco-Schools programme, aimed mainly at primary schools, is a European-wide initiative of the Foundation for Environmental Education (FEE, http://www.abae.pt/) that seeks to encourage and recognize the role of schools in benefiting the Environment. The involvement of schools in this programme has been high, and many have been awarded. In Flores Island the schools EB 2.3/S Padre Mauricio de Freitas, EBI/JI Padre Mauricio Freitas and the Vocational School of S. Jorge - Pole of Flores were awarded in 2004/05 and 2005/06, respectively. The "SOS Cagarro" campaigns have been going on for the last 11 years in the archipelago and aim to involve the population in the rescue of Cory's shearwater juveniles, particularly along the roads. These campaigns are preceded by formal and/or informal clarification sessions with potential partners (government agencies and non-governmental organizations).

Additionally, dissemination actions and materials of various formats have been developed within research projects and contract work throughout the archipelago, namely environmental training and awareness raising sessions, promotional and teaching materials, informative sessions and environmental education activities.

15.2.2. Logistical support

The Ecoteca of Flores Island (**Figure 60**) was inaugurated in September 2003 in a space offered by the municipality of Santa Cruz das Flores in the headquarters of the Associação de Jovens das Flores (Young Association of Flores), in the former French Quarter. It is integrated in the Regional Network of Ecotecas, supported by the Government of the Azores, and is managed by the Associação de Jovens das Flores. It consists of a library for environmental issues, an auditorium, a computer and internet room, a multiple use room (exhibitions/works), a laboratory and a garden. Its teaching materials may be used by schools or other entities upon request. Ecoteca is open Monday to Friday from 9.00 to 12.00 and from 13.00 to 15.30.

Figure 60. The ecoteca of Flores.

Among other activities, it promotes debate on major environmental issues affecting the planet and provides teachers with alternative space, equipment and diverse educational support for thematic lessons on the environment. As a dynamic space, it builds up new values and behaviour by promoting reflection, critical spirit and discussion and by encouraging active participation in the search for viable solutions to environmental problems. Recovering the natural patrimony of the Azores and recognizing the diversity and importance of endemic vegetation are the Ecoteca's main concerns.

Collecting information on medicinal plants of the Azores among the population, promoting "Know to Protect" walking tours to raise knowledge on the ecosystems, temporary exhibitions on environmental issues and competitions relating to environmental and waste issues are some of the activities carried out by the Ecoteca.

The Center for Environmental Interpretation and Cultural of Boqueirão, located in the former whale factory of Boqueirão, will soon be available to the public. It will provide a scientific/cultural space focusing on the connection of the population of Flores Islands to the sea. This centre is supposed to attract the interest of visitors to the coastal and marine habitats and associated fauna of Flores Island, and provide information on how to observe these *in situ*.

With project "*Senderos Temáticos de la Macaronesia*" a survey of walking trails is being carried to be licensed for the observation of natural resources and patrimony of the island. Diving is also an important resource in Flores Island, although of the reduced supply of services for its practice and the absence of a hyperbaric chamber. However, efforts are being made to provide such equipment to be installed in the health centre of Santa Cruz das Flores. Diving services are available in Hotel Ocidental (Santa Cruz) and Clube Naval de Ponta Delgada.

15.3. PROFESSIONAL/SPECIALIZED TRAINING

Most studies and projects in the proposed Biosphere Reserve have an important training component for research students and scholars. Since Flores Island does not have a permanent research center, most projects concentrate field studies and data collection during campaigns and/or scientific expeditions. Specific training is then given to the various elements of the project, to local students of various education levels and other elements of the local population interested in cooperating with the project. National and foreign collaboration is quite usual in such projects, thus privileging the organization of seminars and workshops that contribute greatly to the scientific exchange and training of young researchers. These are also key moments to present the ongoing research to the local community, and raise their interest in the project.

15.4. POTENTIAL TO CONTRIBUTE TO THE WORLD NETWORK OF BIOSPHERE RESERVES

The Government of the Azores and its departments and services have a long and rich experience of intra and inter-regional co-operation with various projects in the area of sustainable development. In particular there is a very strong cooperation within the

Macaronesic space - Madeira and Azores Islands Cape Verde. The Azores have also an active participation within the MAB Programme and particularly in the REDBIOS - Network of Biosphere Reserves in the eastern Atlantic. An example of this is the last meeting of REDBIOS recently made in Flores Island, with the participation of representatives from Portugal, Spain and Canary Islands, Morocco, Senegal, Mauritania, Guinea Bissau, Cape Verde and UNESCO.

This is a clear demonstration of the capabilities that the Flores Island has as a partner and promoter of cooperation and projects that will certainly contribute to the projection and development the network of World Biosphere Reserves.

16. USES AND ACTIVITIES

16.1. CORE ZONE(S)

16.1.1. Describe the uses and activities occurring within the Core Area(s)

Natural Reserve of Morro Alto

This core area consists essentially of wetlands and natural areas associated with a high plant diversity, most of which endemic. Thus, a large portion of this area is reserved for nature conservation and not subject to any human use.

Still, some human activities occur in parts of this area:

- Extensive livestock farming;
- Extensive forestry exploitation;
- Extraction of inert material (sand, gravel and rock);
- Water resource exploitation (collection of springs and streams in tanks);
- Scientific research;
- Collection of traditional aromatic and medicinal plants;
- Leisure and sport (walking trails and hunting)

Natural Reserves of the Maria Vaz Islet and Alagoa and Baixo do Moinho Islets (Figure 61)

These areas are of difficult access and not reacheable by land, thus not subject to relevant human use. Occasionally there are human activities like fishing, shellfish harvesting, diving and bathing in the summer.

Natural Monument Rocha dos Bordões

Consists of a set of large vertical basalt columns that are of difficult access, used only for scenic assessment given its geological beauty and uniqueness.

Figure 61. Alagoa and Baixo do Moinho Islets.

16.1.2. Possible adverse effects on the Core Area(s) of uses or activities occurring within or outside the Core Area(s)

Natural Reserve of Morro Alto

The intensification of use can lead to the transformation of natural and semi-natural areas and significantly reduce wild habitats, namely through:

- Illegal exploitation of inert material (sand, gravel and rock);
- Improvements in communication paths;
- Diversion or obstruction of water streams;
- Destruction or adulteration of water catchment areas;
- Wild tourism (e.g. unauthorized walking trails, 4-wheeled motor sports, among others);

- Agricultural and livestock farming activities (trampling of habitats and protected species).

Natural Reserves of the Maria Vaz Islet and Alagoa and Baixo do Moinho Islets

The development of recreational activities in their adjacent areas (the presence of people, boats, fishing activities, among others) can disturb birds (especially during their breeding season, that will increase reproductive failure) and degrade vegetation cover, thus favouring erosion.

16.2. BUFFER ZONE(S)

16.2.1. Describe the main land uses and economic activities in the Buffer Zone(s)

Protected Area for Resource Management of Costa Norte

This area is totally marine, and the main human activities are bathing, professional and recreational coastal fishing, spearfishing and diving and the consequent traffic of vessels (tourist and fishing trips).

Protected Area for the Management of Habitats or Species of Caldeira Funda and Caldeira Rasa and Protected Landscape Area of Zona Central

The main human activities in these areas are agriculture and forestry, the extraction of inert material (sand, gravel and rock) and tourism (mainly walking trails).

Protected Areas for the Management of Habitats or Speciest of Costa Norte, Costa Sul and Ponta da Caveira and Protected Landscape Area of Costa Norte

These areas are partially not affected by human use. In the areas where there is human use, their main activities are:

- Agriculture and livestock farming;
- Fishing;
- Diving;
- Spear fishing;
- Recreational sailing;

- Bathing (with emphasis on Fajã de Lopo Vaz, accessible only on foot that is used as a non- explicit bathing area);
- Tourism;
- Deposition of waste.

In the northwest coast there is still a village - Ponta da Fajã - with an average of 15 inhabitants.

16.2.2. Possible adverse effects on the Buffer Zone(s) of uses or activities occurring within or outside the Buffer Zone(s)in the near and longer terms

The main adverse effects arising from the current use of the territory and other threats include:

- The use of fertilizers in pastures that combined with livestock excreta can lead to nutrient imbalance in the ecosystems, which can be particularly dangerous in lakes;
- Opening of roads and clearings for agriculture and forestry and extraction of inert material, which have major impacts on the loss of natural species, the fragmentation of their vegetation niches, a progressive invasion of exotic species and a progressive eutrophication of wetlands;
- Disturbance of sterns and other seabirds by recreational and tourism activities with boats and fishermen in the proximity of islets and cliffs, that may cause a reduction in their reproductive success (predation and trampling of nests and chicks, and possibly abandonment of nests by parents);
- Serious erosion problems on the south coast (characterized by high/ very high unstable cliffs) that require urgent stabilization measures in the abovelying land;
- Contamination of soil, streams, waterfalls and the marine environment resulting from the open-air deposition of waste;
- Increasing undisciplinned tourism through protected habitats.

16.3. TRANSITION AREA

16.3.1. Describe the main land uses and major economic activities in the Transition Area(s)

Marine areas

In marine areas the most common activities are small-scale commercial and recreational fishing, and nautical tourism activities such as diving, boat trips and the observation of birds and cetaceans.

Terrestrial areas

Transition terrestrial areas are characterized by a scattered population along the coastal areas and "fajãs", and an important rural landscape of agricultural and farming areas. Most productive activities of Flores Island develop on the transition areas, namely livestock farming, extensive agriculture, industrial activities (with emphasis on dairy products), and extraction activities (inert material, forestry). Most trade activities, public administrative services, educational institutions, the airport (**Figure 62**) and the harbour (**Figure 63**) of Flores Island are located in the two villages - Santa Cruz and Lajes.

Figure 62. The airport in Santa Cruz.

Most tourist accommodation and catering facilities also occur in the transition zone. The most attractive bathing areas are the natural swimming pools and harbours of Fajã Grande and Santa Cruz (**Figure 64**), the beach of Lajes, and Baía de Alagoa.

Figure 63. Lajes harbour.

Many of the population settlements are rural and devoted to the exploitation of the surrounding fields and pastures. They are usually located in valleys and smoothly sloping land in the vicinity of water streams, and preserve their traditional architectural characteristics of high patrimonial interest, particularly Fajãzinha. Land parcels are arranged in terraces and divided by basaltic rock walls, of great scenic value.

Some areas of the transition zone have low human occupation due to local morphological characteristics. High steep cliffs and very deep valleys do not favour human settlement, and thus land is mainly occupied by patches of natural and naturalized vegetation and pastures. Except for the cluster of Caveira (on a platform between two deep valleys), the west coast, the south coast, the northwest coast and the central plateau are good examples of such inhospitable areas.

Figure 64. Natural swiming pools in Santa Cruz.

16.3.2. Possible adverse effects of uses or activities on the Transition Area(s)

Marine areas

Marine areas can become degraded by the deposition of waste brought by contaminated water seepage from cliffs or thrown overboard in boats and dragged to the coast.

Fish resources might become over-exploited with the uncontrolled rise of the exploitation of living organisms.

Human activities may disturb birds, mainly by decreasing their reproductive success. Similarly, the development of fishing and nautical tourism can disturb cetaceans and lead to the abandonment of the area.

Terrestrial areas

Land use in polulation settlements can have negative effects, such as:

- urban pressure arising from the tourist potential of some areas, such as Fajã Grande, has led to the disorganized construction of contrasting buildings;

- The urban expansion of Santa Cruz, caused by its increasing population, has been disorganized and contrasting with traditional architecture, namely building on the coastline, thus worsening coastal erosion;
- The visual impact of the aerodrome (all along the urban settlement of Santa Cruz) could be minimized by proper landscape framing;
- proper territorial planning in Ponta Delgada is required to prevent disorganized construction that is contrasting with traditional architecture;
- Extraction of inert material (sand, gravel and rock) also degrades landscape. The quarry in Castelo/Arreiro has a highly negative and visible impact on the landscape in the proximity to the regional road, thus requiring a recovery and management plan. Similarly, the bathing area in Baía de Alagoa is also threatened by a quarry of strong visual and environmental impact;
- Trash deposited along the coast next to Ponta do Ilhéu endangers the quality of the environment;
- The excessive use of chemicals in agriculture can lead to the destruction of native plant communities;
- The opening of paths and trails for agricultural access has several negative impacts on biodiversity, exotic species invasion, water regime chenges, and increase in pastures and grazing. As invasive species take over natural areas, natural communities get fragmented into small mosaics and increasingly vulnerable;
- Mismanaged tourism and recreational activities that disregard planning rules can lead to the degradation and adulteration of transition areas.

Despite the possible adverse effects, given the decreasing population over the last century, in the medium term it is not expected that an increase in human activities will threaten the conservation of natural values considered in the proposed Biosphere Reserve or the implementation of measures for a sustainable development of local communities.

17. INSTITUTIONAL ASPECTS

17.1. State, Province, Region or other Administrative Units

State: Portugal

Administrative Region: Autonomous Region of the Azores

Municipality: Santa Cruz das Flores and Lajes das Flores

17.2. Units of the proposed Biosphere Reserve

The proposed Biosphere Reserve is Flores Island and adjacent marine area.

17.3. Protection regime of the Core Area(s) and, if appropriate of the Buffer Zone(s)

17.3.1. Core Area(s)

The core zones coincide with the protected areas defined in the Natural Park of Flores Island, with the categories of Natural Reserve or Natural Monument, namely:

a) Natural Reserve of Morro Alto

b) Natural Reserve of Maria Vaz Islet

c) Natural Reserve of Alagoa and Baixa do Moinho Islets

d) Natural Monument of Rocha dos Bordões

Under Article 60. of the Political-Administrative Statute of the Azores Region and No. 3 of Article 17. of the Regional Legislative Decree No. 15/2007/A, of June 25, the Government presented to the Legislative Assembly a proposal for a Regional Legislative Decree on the Establishment of the Natural Park of Flores Island. In accordance with Article 17. of the Regional Legislative Decree No. 15/2007/A, of June 25, the Island Natural Park alongside with the Marine Park of the Azores archipelago constitute the management basis for the Regional Network of Protected Areas of the Azores. These two types of protected areas are managed by self organisational structures and concepts. The Natural Forest Reserves partially created under Regional Legislative Decree No 15/87/A, of July 24 classified as Natural Reserves by the Regional Legislative Decree No. 15/2007/A, of June 25 integrate the Natural Park of Flores Island, thereby acknowledging their natural value from a conservationist point of view, matching Caldeira Funda and

Rasa, Morro Alto and Pico da Sé in terms of importance and relevance to other areas of the Regional Network of Protected Areas. The Natural Park of Flores Island covers an area of particular landscape, natural and geological interest that deserved for long its integration in the Regional Network of Protected Areas. In this sequence, the Natural Monument of Rocha dos Bordões is classified, since it lacked the necessary emphasis and a particular status of protection despite being integrated in the Natura 2000.

The Natural Park of Flores Island also classifies Important Bird Areas (IBA) as designated by BirdLife International, recognised worldwide for the establishment of partnerships for the development of measures to protect birds and their habitats. In the specific case of the Azores these areas include seabirds that inhabit cliffs.

To articulate territorial management instruments and nature conservation policies the Natural Park of Flores Island integrates areas classified as Sites of Community Importance - SCI - and Special Protection Areas – SPA - within the Sectorial Plan of Natura 2000 for the Autonomous Region of the Azores, approved by the Regional Legislative Decree No. 20/2006/A, of June 6, amended by the Regional Legislative Decree No. 7/2007, of April 10. The Natural Park of Flores Island is thus a coherent and integrated conservation management unit envisaging the conservation of nature, landscape and natural resources, based on scientific classification criteria within international, national, regional and local guidelines.

The three Natural Reserves are classified sites within Natura 2000, which is the key instrument for nature and biodiversity conservation in the European Union. The EU directives relating to Natura 2000 are transposed into Portuguese national law by the Decree-Law 140/99, of April 24, amended by Decree 49/2005, of February 24 and adapted to the Azores by the Regional Legislative Decree 18/2002/A, of May 16. The List of Sites of the Azores were published by Resolution 30/98/A, of February 05. The sites of Community importance for the biogeographical region Macaronesia (Madeira, Azores and Canary Islands) were published by the Commission Decision 2002/11/EC, of December 28. The Special Protection Areas of the Azores were published by Regional Decree 14/2004/A, of May 20. The Regional Legislative Decree 20/2006/A, of June 6, approved the Natura 2000 Sectorial Plan for the Autonomous Region of the Azores, which includes measures for the conservation of areas of Natura 2000 in the archipelago.

The new designation of the Natural Reserve of Morro Alto was proposed in the Natural Park of Flores Island as an alternative to the partial Natural Forest Reserves of Morro Alto and Pico da Sé created in paragraph b) of article. 1 and delimited in No.1 of paragraph d) of article 2 both of the Regional Legislative Decree No 27/88/A, of July 22, classified as Natural Reserve in No. 2 of article 37 of the Regional Legislative Decree No.

15/2007/A, of June 25. The scope, objectives and boundaries of the Natural Reserve of Morro Alto are those defined for the Site of Community Importance (SCI) Zona Central - Morro Alto.

The scope, objectives and boundaries of the the Core Zone Natural Reserve of Maria Vaz Islet are those defined for the Special Protection Area (SPA) Costa Nordeste and the SCI Costa Nordeste, within the regimes set by the Natural Park of Flores Island and the Sectorial Plan of Natura 2000. Areas that meet the Bird Life International classification criteria for IBA are included within the territorial boundaries defined for the Natural Reserve of Maria Vaz Islet. The Integral Reserve Areas for the capture of limpets defined in No. 9 of Article 4 of the Regulatory Regional Decree No. 14/93/A, of July 31 are included within the Natural Reserve.

The scope, objectives and boundaries of the Core Zone Natural Reserve of Alagoa and Baixa do Moinho Islets are those defined for the Costa Nordeste SPA and the Costa Nordeste SCI and notes, within the regimes set by the Natural Park of Flores Island and the Sectorial Plan of Natura 2000. Areas that meet the Bird Life International classification criteria for IBA are included within the territorial boundaries defined for the Natural Reserve of Alagoa and Baixa do Moinho Islets. The Integral Reserve Areas for the capture of limpets defined in No. 9 of Article 4 of the Regulatory Regional Decree No. 14/93/A, of July 31 are included within the Natural Reserve.

The scope, objectives and boundaries of the Core Zone Natural Monument of Rocha dos Bordões are those defined for the Zona Central - Morro Alto SCI, within the regimes set by the Natural Park of Flores Island and the Sectorial Plan of Natura 2000.

17.3.2. Buffer Zone(s)

The Buffer Zones coincide with the protected areas defined in the Natural Park of the Flores Island, with the categories of Protected Area for the Management of Habitats or Species, Protected Landscape Area and Protected Area for Resource Management.

The use of land in buffer zones is regulated by different planning mechanisms, with special emphasis on the measures resulting from the FEADER - European Agricultural Fund for Rural Development 2007-2013, implemented by the Prorural Program in the Azores, and on the Director Municipal Plans of Lajes and Santa Cruz das Flores. Part of the areas included in the buffer zones are classified as Regional Agricultural Reserve, which implies that there can be no urban development unless for maintaining and restoring previously existing buildings. Additionally, there are other management tools to guide territorial and activity planning, namely the Regional Territorial Planning Act for the

Azores (PROTA), the Regional Plan for Sustainable Development of the Autonomous Region of the Azores (PReDSA) and Tourism Planning Act for the Autonomous Region of Azores (POTRAA).

The Government of Azores is responsible for managing and monitoring the marine area up to 12 nautical miles away from shore (territorial sea), where extraction activities are regulated by various legal instruments.

The Protected Area for the Management of Habitats or Species of Caldeira Funda and Caldeira Rasa is the new designation for the partial Natural Forest Reserve of Caldeira Funda and Caldeira Rasa created in paragraph b) of Article. 1 delimited by paragraph c) of No. 1 of Article 2 included in the Natural Park of the Flores Island. The scope, objectives and boundaries of the Protected Area for the Management of Habitats or Species of Caldeira Funda and Caldeira Rasa are those defined for the Zona Central – Morro Alto SCI, within the regimes set by the Natural Park of Flores Island and the Sectorial Plan of Natura 2000.

The Natural Reserve of Morro Alto, the Natural Monument of Rocha dos Bordões and Protected Area for the Management of Habitats or Species of Caldeira Funda and Caldeira Rasa are included in the Protected Landscape Area of Zona Central. The scope, objectives and boundaries of the Protected Landscape Area of Zona Central are those defined for Zona Central - Morro Alto SCI, within the regimes set by the Natural Park of Flores Island and the Sectorial Plan of Natura 2000.

The scope, objectives and boundaries of the Protected Area for the Management of Habitats or Species of Costa Norte are those defined for Costa Nordeste SIC and Costa Nordeste SPA, within the regimes set by the Natural Park of Flores Island and the Sectorial Plan of Natura 2000. Areas that meet the Bird Life International classification criteria for IBA are included within the territorial boundaries defined for the Protected Area for the Management of Habitats or Species of North Coast. The Integral Reserve Areas for the capture of limpets defined in No. 9 of Article 4 of the Regulatory Regional Decree No. 14/93/A, of July 31 are included within the Protected Area for the Management of Habitats or Species of North Coast.

The scope, objectives and boundaries of the Protected Area for the Management of Habitats or Species of Costa Sul are those defined for Costa Sul e Sudoeste SPA, within the regimes set by the Natural Park of Flores Island and the Sectorial Plan of Natura 2000. Areas that meet the Bird Life International classification criteria for IBA are included within the territorial boundaries defined for the Protected Area for the Management of Habitats or Species of the South Coast. The Integral Reserve Areas for the capture of limpets defined in No. 9 of Article 4 of the Regulatory Regional Decree No.

14/93/A, of July 31 are included within the Protected Area for the Management of Habitats or Species of the South Coast.

Areas that meet the Bird Life International classification criteria for IBA are included within the territorial boundaries defined for the Protected Area for the Management of Habitats or Species of Ponta da Caveira.

The scope of the Protected Landscape Area of Costa Norte includes the Natural Reserve of Morro Alto and the Protected Area for the Management of Habitats or Species of Costa Norte.

The scope of the Protected Area for Resource Management of Costa Norte includes the Natural Reserve Areas of Maria Vaz Islet and Alagoa and the Baixa do Moinho Islets and the Protected Area for the Management of Habitats or Species of Costa Norte, within the rules set in the Natural Park of Flores Island and the banned or conditional activities subject to prior binding opinion of the competent environmental authority.

17.4. LAND USE REGULATIONS OR AGREEMENTS APPLICABLE TO THE TRANSITION AREA

The use of the Transitional Zone is regulated by the Director Municipal Plans (PDM) of Santa Cruz and Ponta Delgada. Additionally, there are other management tools to guide territorial and activity planning, namely the Regional Territorial Planning Act for the Azores (PROTA), the Regional Plan for Sustainable Development of the Autonomous Region of the Azores (PReDSA), the Coastal Management Plan (POOC) and the Tourism Planning Act for the Autonomous Region of Azores (POTRAA).

The two PDMs aim at formulating the model of spatial structure of the territory of each county.

The PROTA, currently under public discussion, is an instrument of territorial management that defines the strategy for territorial development for the archipelago based on the articulation of the various regional and national sectoral policies. The regional strategy considers the municipal development strategies, while simultaneouly setting clear and unambiguous reference for the formulation and review of the municipal territorial development plans.

The PReDSA formally translates the political commitment of the Region for the purpose of sustainability. This plan serves as a link between the general principles (European Strategy for Sustainable Development, and National Strategy for Sustainable Development) and the specific characteristics of the Azores, defining the actions that respond to the current experience of its population, and reflect their future expectations.

The POOC envisages the sustainable management of social, economic and ecological development in coastal areas of Flores Island. Its terrestrial boundary is set at 500m distance from the shoreline, and the marine boundary at the 30m bathymetric line. The POOC consists of the key elements (regulation, synthesis plant and conditionality plan) and various reports.

The POTRAA seeks the establishment of strategic options for economic development policy, focusing particularly on: the tourism sector and its recovery in the Region; improved product quality; changes in the international tourism market; and the safeguard and development of natural and cultural resources of the archipelago.

17.5. LAND TENURE OF EACH ZONE

17.5.1. Core Area(s)

All areas are public domain (terrestrial, marine or hydric).

17.5.2. Buffer Zone(s)

Approximately 56% of the buffer zone is a marine area. The remaining area is mainly public land with small areas of private pasture. Ponta da Fajã has private areas used mainly for housing, farming and pasture.

17.5.3. Transition Area(s)

Approximately 81% of the transition zone is a marine area. The remaining area (19%) is occupied by private and public land, which includes the two towns of the island and most rural parishes.

17.5.4. Foreseen changes in land tenure

There are no changes planned, nor plans to purchase land.

17.6. MANAGEMENT PLAN OR POLICY AND MECHANISMS FOR IMPLEMENTATION

Management plans and existing regulations will continue to be applied. It will be carried out a strategic and reference plan for the Biosphere Reserve, based on cooperation between various partners. It will also be articulated the plan of the Reserve

with the Plan of the Island Nature Park, and their joint actions, particularly in the fields of conservation, education and environmental information.

17.6.1. Indicate how and to what extent the local communities living within and next to the proposed Biosphere Reserve have been associated with the nomination process

In July 2008 it was made a public presentation of the proposed submission of the Biosphere Reserve of the island of Flores to the MAB Programme. This event counted with the presence and participation of representatives of other Biosphere Reserves belonging to REDBIOS and served not only to present the proposal of the candidacy of Flores Island but also the experience of the other Biosphere Reserves.

It was also developed contacts at different times with representatives of local institutions to let them know details of the MAB Programme and obtain its cooperation in the proposal and establishment of the Biosphere Reserve. Special attention and contacts were developed with the municipal authorities.

After, the application form was made available in digital format to the public through an Internet site. It was also created an e-mail address to which all suggestions and comments could be sent, and encouraged public participation in the application. All these events had significant media coverage on local, regional and national newspapers and TV.

17.6.2. Main features of management plan or land use policy

It is expected that the implementation of the Biosphere Reserve, in the long term, ensure the protection and promotion of natural values, within the framework of all human activities. This should enable economic development and improve the quality of life of the Biosphere Reserve, on a sustained and continuous way.

The lines of action already initiated will be continued, especially those established in the Regional Plan of Spatial Planning of the Azores, the Regional Plan for Sustainable Development of the Autonomous Region of the Azores, in Sectoral Plan for Natura 2000 in the Azores, and the Management Plan for the Tourism of Azores. For the Buffer and Transition Zones, in addition to the above mentioned plans it will be added the EAFRD - European Agricultural Fund for Rural Development 2007-2013, implemented in the Region by the Prorural Program, and the Municipal Master Plans.

Along with the stakeholders it will be created a strategic and reference plan for the Biosphere Reserve, integrating the main objectives of those lines of action in order to

reflect the functions of conservation, development and logistical support for the Biosphere Reserve. This strategic plan will be dynamic and as the work in Biosphere Reserve is progressing, will be reviewed and reformed to improve its implementation.

It will be encouraged the participation and initiative of the local population to enable that the locals are the biggest beneficiaries of the changes implemented, ensuring that they will be interested in maintaining and developing the Biosphere Reserve.

As the activities and participation of the community will increase, the Biosphere Reserve will be self-sustained and the mutual benefits of conservation and exploitation of the natural and cultural values will be clear, not only locally but also disseminated near other similar communities, either in the Azores archipelago, or internationally.

17.6.3. The designated authority or coordination mechanisms to implement this plan or policy

The Regional Network of Protected Areas of the Azores (REAPA) embodies, in the Region, the classification adopted by the International Union for Conservation of Nature (IUCN) adapting it to the geographical, environmental, cultural and political-administrative conditions of The Azores archipelago.

The general objectives of the Regional Network of Protected Areas of the Azores, are the following:

a) Achieve the affirmation of identity and value of each protected land or sea area;

b) Establish mechanisms for conservation, preservation and management of ecosystems, biodiversity and the natural values and the scenic, scientific and spiritual resources of Azores;

c) Contribute to the formation of a key network for nature conservation that coordinates the various schemes of protection of the natural values and resources;

d) Create units for management of protected areas at each island.

The REAPA projects to create in each island an Island Natural Park (INP), consisting of land areas classified in the territory of each island, and may include, in addition, sea areas, which may reach the outer limit of the territorial sea. The INP is the basic unit of management of the Regional Network of Protected Areas of the Azores and is created by regional legislative decree.

The management system of REAPA is currently (2008) on implementation after a process of public discussion. Until the full deployment, the management of each area will be provided by Environmental Services of the island which is the operative organ of the Government of Azores coordinated by the Regional Secretariat of Environment and Sea

Each INP will have an organic structure that will integrate the following organs:

a) Board of Management is the executive organ which includes a director who chairs and is committed with the power to administer the special interests of the INP, running the methods contained in the instrument management and ensuring compliance with the law and regulations in force;

b) Advisory Council is the advisory body which must follow and assess, in general, the activities carried out by the INP.

The regional legislative decree that will accomplish the creation of the INP will define the powers, composition, number and methods of appointing members of the Management Board and the Advisory Board as well as the structure and functioning of all management organs above referred.

17.6.4. The means of implementation of the plan or policy management

The policy of conservation of natural heritage has been implemented designating the most important areas for the protection of natural values under distinct figures of protection. Among these it can be highlighted the areas designated under the Natura 2000. In order to provide a more efficient management of these areas, it was carried out a process of reclassification of protected areas in the Azores adapting their names to the UICN nomenclature system and reorganizing the management of the protected areas in order to create in each island a single directive organ of Protected Areas that will have skills in management/administration of the areas under their remit.

In most cases the implementation of management measures is made after consultation and public discussion, arriving to an agreement with end users about the best way to conciliate the mutual interests of exploitation and conservation. Most of the areas that are under protection do not require agreement to individuals as they are public areas. In cases of private land, attempts to reach agreement, either through incentives or compensation for changes of use are used in order to achieve the objectives of management by consensus. In some rare cases, it may be used expropriation of land where the values contained therein require the use of more drastic measures due to difficult or impossible consensus.

17.6.5. Indicate how and to what extent the local communities participate in the formulation and the implementation of the management plan or policy

Any changes to the legal instruments of territorial management have a period of public discussion preceding its effective implementation and where all citizens can participate.

It is envisaged the creation of an Advisory Council with representatives of various interests in the proposed Biosphere Reserve, which will also participate in the management of reserves. The form and participants of this organ are not yet defined but should include representatives of municipalities, the main economic activities, interests of nature protection and other interests relevant to the functioning of the Reserve.

This panel will have at least an advisory role, but is expected to have also an active participation in the management and promotion activities to develop the Biosphere Reserve proposal.

17.6.6. The year of start of implementation of the management plan or policy

In 2006 measures have been taken to implement the management actions in the areas classified as part of Natura 2000 through the publication of the necessary legal instruments. In 2008 it was approved and published the legislation framework at the regional level on protected areas. It is expected to be produced in one year the reference and strategic plan of the Biosphere Reserve and starting its implementation immediately thereafter.

17.7. FINANCIAL SOURCE(S) AND YEARLY BUDGET

17.7.1. Sources of funding

The possibilities of funding will depend on the type of actions to promote and their promoters:

Component of studies and monitoring - the investment will be mainly from the initiative of the authority managing the protected areas, promoting the necessary procedures for studies and bear the burden of Surveillance Teams;

Management Component of Nature Conservation and Promotion of Sustainable Development - the investment to be undertaken in this area will

be private initiative, regarding economic activities and whether public/private under the management of species and habitats;

Support Component of Visitation for Environmental Information – the investment in this area will be public, especially from the initiative of the authority that manages the protected areas.

Regardless of the nature of the promoters, these actions can also be co-financed. For this, and given the nature of their promoters, we can define two major options for financing:

Promoters of public nature - co-financing through QRESA (FEDER and FEOGA programming funds) and/or Interregional Cooperation Programme (through joint applications with other regions in the framework of the European cooperation) and through the budgets allocated to public entities;

Private Promoters - co-financing through QRESA (FEOGA, IFOP, FEDER programming funds) or specific programmes for funding assistance of economic activities designed and financed by the authority responsible for the management of protected areas.

Finally, for the cost of managing the programme, the funding may come, depending on the option chosen for the Authority's Management Reserve, the entities represented, the entity competent of management of protected areas, or possibly the co - Community funding, as part of a comprehensive application of the investment in this application.

17.7.2. Predicted budget

On a strategic view regarding the management objectives, it was possible to structure a budget for the Biosphere Reserve in order to estimate the costs of implementation for a time horizon of five (5) years.

Interventions were grouped according to the following types, whose content and assumptions of calculating charges will be addressed in more detail:

a) Studies and monitoring

b) Promotion of sustainable development and management of nature conservation

c) Support to visitors and environmental information

a) Studies and monitoring

These goals are organised in two actions including studies, and joining "monitoring" with the "surveillance".

- Studies: the aim in this area is to respond to some information gaps related with the management of threats, real or potential, referred to some of the classified areas. Some studies are predicted, especially designed to provide information that helps future decision, for example: identification, geo-referenced, water sources, location of infrastructures, impacts arising from some activities under way or planned, etc.

- Surveillance and Monitoring: in this start-up phase, monitoring shall be interpreted as priority. Given the need for strengthen the surveillance in classified areas, it is understood that these actions should be carried out by the Guards of Nature, given that the surface of these areas is often in whole or in part, included in the Regional Network of Protected Areas. As for the monitoring of species and habitats that will be targeted, these actions may be carried out in collaboration with public and private entities (other organisms of the Region, universities, NGOs, etc.), mainly the surveillance and monitoring of marine areas, also with the support of the Nature Guards, whose training in this field becomes increasingly important.

b) Promoting sustainable development and management of nature conservation

This includes the actions by public entities or private, in a way of active management of the territory aimed at obtaining positive effects in terms of improvement and/or preservation of habitats and species which were to the effect, grouped in two actions:

- Intervention on economic activities: This includes, the burden expected to support private entities whose activities requires readjustments in order to fit with the objectives of sustainable development pursued by the protected areas.

- Management of species and habitats: It covers actions to be undertaken by public and private entities, whether they take place in inland areas or in the

marine environment.

There are predicted here, especially, interventions in forest areas and shrub ecosystems to recover or improve, both in terms of control/eradication of exotic species, or the increase of the area occupied by indigenous plant species. It is also expected, with these actions at the level of plant cover, benefits for the water system of target areas and a significant contribution to the recovery of associated faunal species.

c) Support visitation and environmental information

The increase of tourism in the Azores is undoubtedly one of the pillars of its economic development. There is a feeling that the visitation of the classified Areas, are real ex-libris of the Azores islands.

Thus it is proposed to divide this goal in two actions, whose content is readily apparent by their name:

- Support infrastructure to visitors: It is included in this action, interventions in order to guide the flow of visitors and so preventing any degradation on the most valuable areas.

  This will include not only the signalling aspects but also equipments and works needed to guide and limiting accesses, like, pedestrian trails or mopeds, sealing of particularly sensitive areas, parking places etc.

  Were also included in this area, construction of support infrastructure to visitors, whose location and/or configuration needs special attention given the proximity of priority habitats.

- Information and environmental awareness: This action includes the meetings and technical work and/or information, to be held either with the people living in the protected areas as well as with the policy makers and the private sector that constitute the universe of interlocutors of public and private entities with responsibility for nature conservation and management of classified areas.

  It also covers the preparation of seminars, courses, workshops and other activities that would capture the attention and presence not only of the resident population but also the visitors, who will elect Flores Island as a tourist destination, seeking specifically its natural areas to visit.

  It is also within the framework of this action, to edit an entire set of educational materials and dissemination that allow a growing awareness about the various

components of the rich natural and cultural heritage of the island, and carry out the activities of maintenance of these components in a favourable conservation status or either to rehabilitation/recovery of species and/or habitats at risk or degraded.

Projected budget

Table 6. Projected budget (values are presented in Euros).

	Total	Year n	Year n+1	Year n+2	Year n+3	Year n+4
a) Studies and Monitoring	**130.000**	**30.000**	**25.000**	**25.000**	**25.000**	**25.000**
1 - Studies	30.000	10.000	5.000	5.000	5.000	5.000
2 - Surveillance	100.000	20.000	20.000	20.000	20.000	20.000
b) Promoting sustainable development and management of nature conservation	**1.170.000**	**330.000**	**210.000**	**210.000**	**210.000**	**210.000**
1 - Management of species and habitats	70.000	30.000	10.000	10.000	10.000	10.000
2 - Intervention on economic activities	1.100.000	300.000	200.000	200.000	200.000	200.000
c) Support Visitation and Environmental Information	**66.000**	**18.500**	**17.500**	**13.000**	**9.000**	**8.000**
1 - Infrastructure to visitors	52.000	16.000	15.000	10.000	6.000	5.000
2 - Information and environmental awareness	14.000	2.500	2.500	3.000	3.000	3.000
TOTAL	**1.366.000**	**378.500**	**252.500**	**248.000**	**244.000**	**243.000**
Management Program	136.000	37.850	25.250	24.800	24.400	24.300
GRAND TOTAL	**1.502.000**	**416.350**	**277.75**	**272.800**	**268.400**	**267.300**

For the first five years and based on the assumptions used for the calculation already explained, it is estimated that the budget for the activities of the Biosphere

Reserve, will reach a direct overall cost of 1.366.000,00€ and an indirect added burden to the "Management Program", equivalent to 10% of the previous value.

17.8. AUTHORITY(IES) IN CHARGE

17.8.1. The proposed Biosphere Reserve as a whole

Name: Regional Secretariat of the Environment and the Sea; Government of the Autonomous Region of the Azores.

17.8.2. The Core Area(s)

Name: Regional Secretariat of the Environment and the Sea; Government of the Autonomous Region of the Azores.

Legal powers: legislation, planning, use of the territory and environmental supervision of the Autonomous Region of the Azores.

17.8.3. The Buffer Zone(s)

Name: Regional Secretariat of the Environment and the Sea; Government of the Autonomous Region of the Azores.

Legal powers: legislation, planning, use of the territory and environmental supervision of the Autonomous Region of the Azores.

Name: Municipalities of Lajes and Santa Cruz das Flores

Legal Powers: planning and use of the territory.

18. SPECIAL DESIGNATIONS

( ) UNESCO World Heritage Site

( ) RAMSAR Wetland Convention Site

(X) Other international conventions/directives

- European Community Directive No. 79/409/EEC - Birds Directive
- European Community Directive No. 92/43/EEC - Habitats Directive

(X) Other regional conventions/directives

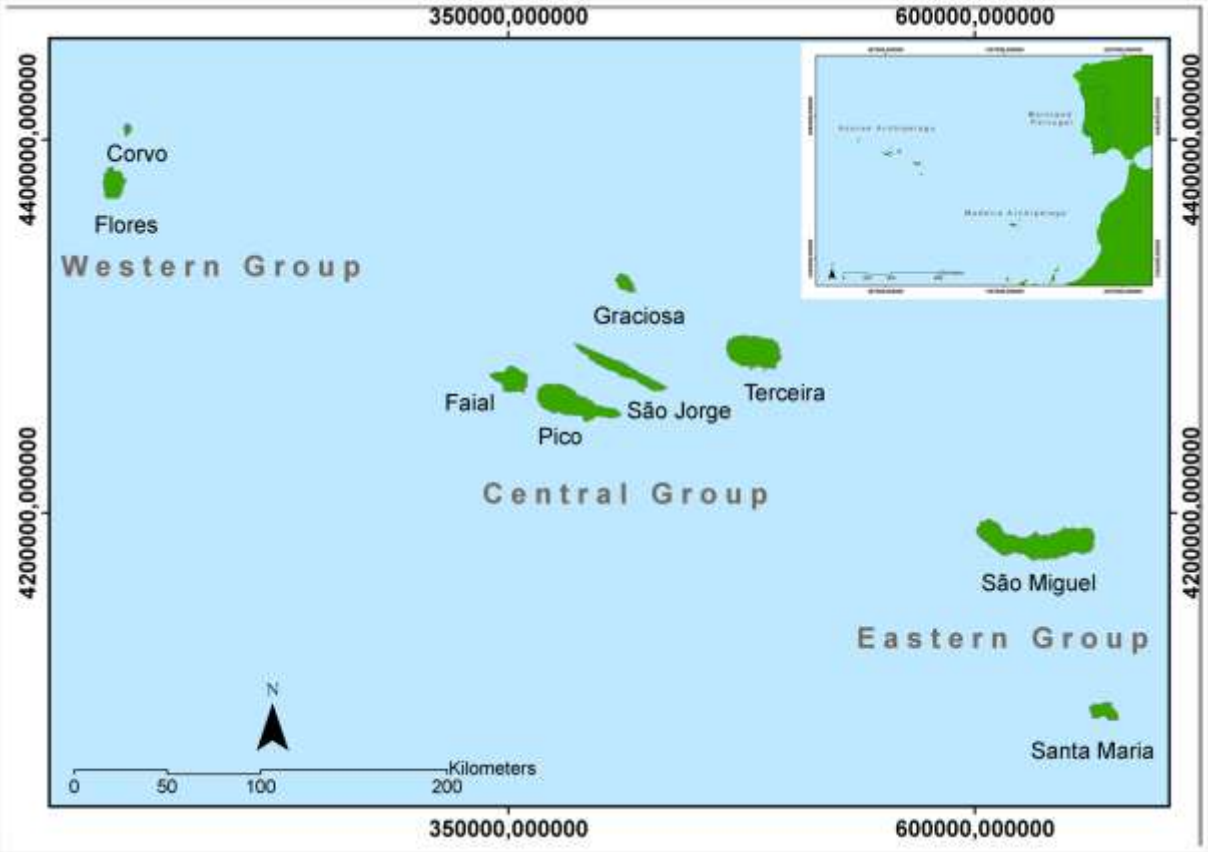
- Integral Reserve Zone of Pico das Lapas (Regional Decree No. 14/93/A, of July 31)

( ) Site for continuous monitoring

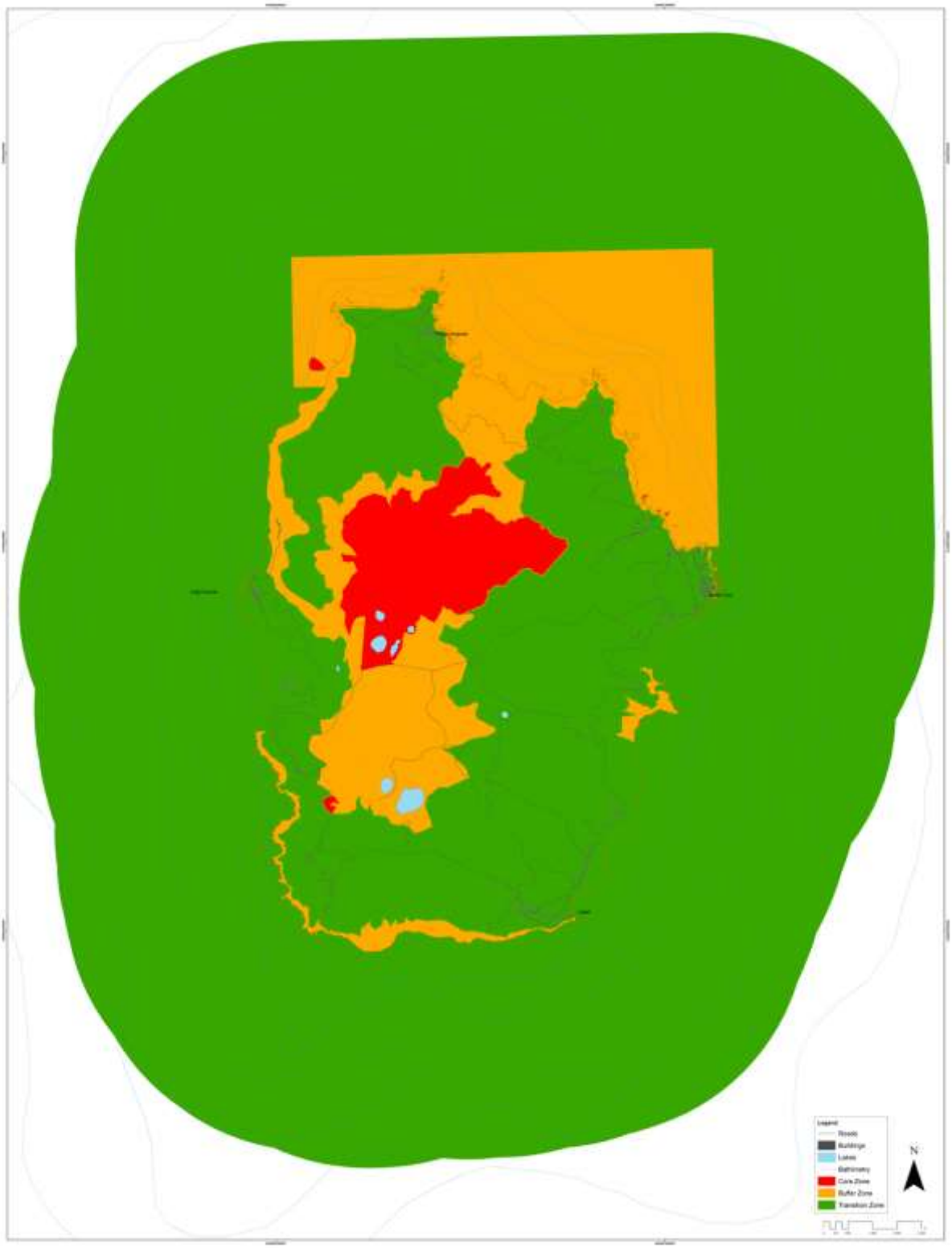
19. SUPPORTING DOCUMENTS

19.1. MAPS

19.1.1. General location



19.1.2. Biosphere Reserve zonation



19.2. LIST OF LEGAL DOCUMENTS

19.2.1. Regional documents

Fisheries and related activities

(1983) Ordinance No. 19/83, of May 3: Establishes the new protection regime for some crustaceans in the Region.

(1985) Regional Legislative Decree No. 5/85/A, of May 8: Establishes the juridical regime for non-professional spear fishing in the Azores Autonomous.

(1993) Regional Regulatory Decree No. 14/93A, of July 31: Approves the regulation for limpet harvesting.

(1993) Ordinance No. 43/93, of September 2: Defines and regulates the harvesting of limpets as a recreational activity for non commercial use.

(1994) Ordinance No. 35/1994, of July 21: Authorizes the use of gill nets in non oceanic interior waters.

(1999) Ordinance No. 32/99, of June 4: Establishes the operation area for coastal fishing vessels.

(2001) Ordinance No. 57/2001/A, of September 13: Defines the licensing rules for purse seining in the Azores.

(2002) Ordinance No. 101/2002/A, of October 24: Regulates the fishing gear called "line fishing" in the Azores Autonomous region.

(2004) Declaration No. 2/2004, of May 6: Corrects the document "Ordinance No. 30/2004, of April 22" issued by Secretaria Regional da Agricultura e Pescas (Regional Secretariat for Fisheries and Agriculture), regulating the fisheries with traps and pots in the Azores Autonomous Region.

(2004) Ordinance No. 30/2004/A, of April 22: Regulates the fisheries with traps and pots in the Azores Autonomous Region.

(2005) Ordinance No. 91/2005, of December 22: Regulates the fisheries with gill nets in the Azores Autonomous Region.

(2006) Ordinance No. 23/2006, of March 9: Establishes the minimum size for the capture of Black Spotted Sea Bream (*Pagellus bogaraveo*) in the waters of the sub-area of Azores, in the national Exclusive Economic Zone.

(2006) Ordinance No. 34/2006, of April 27: Changes the document "Ordinance No. 91/2005, of December 22" (regulates the fisheries with gill nets in the Region).

Environment Conservation

(1988) Regional Legislative Decree No. 27/88/A, of July 22: creates the Natural Reserves of Caldeira Funda and Caldeira Rasa.

(1993) Regional Legislative Decree No. 21/93/A, of December 23: Applies to the Region the juridical regimen established by "Decree-law No. 19/93, of January 23" (National Network of Protected Areas).

(1998) Resolution No. 30/98, of February 5: Approves the list of Sites of Community Importance of the Azores Region (Phase 1).

(1998) Declaration No. 12/98, of May 7: Corrects the document "Resolution No. 30/98, of February 05", that approves the list of Sites of Community Importance of the Azores Region (Phase 1).

(1999) Regional Legislative Decree No. 9/99/A, of March 22: Regulates the cetacean watching activity in the Azores.

(2002) Regional Legislative Decree No. 18/2002/A, of May 16: Adapts to the Region the "Decree-law No. 140/99, of April 24", that reviews the transposition to the internal right of the EU directives relative to the conservation of birds (Birds Directive) and the conservation of natural habitats and the wild fauna and flora (Habitats Directive).

(2003) Regional Legislative Decree No. 10/2003/A, of March 22: Alters the "Regional Legislative Decree No. 9/99/A, of March 22", that regulates the cetacean watching activity in the Azores.

(2004) Regional Regulatory Decree No. 14/2004/A, of May 20: Classifies the special protection areas (SPAs) of the Azores.

(2004) Ordinance No. 5/2004, of January 29: Regulates the legal regimen for cetacean watching.

(2005) Regional Legislative Decree No. 6/2005/A, of May 17: Transposes the "Directive No. 91/676/CEE, of December 12" regarding the protection of waters against pollution caused by nitrates of agricultural origin.

(2006) Regional Legislative Decree No. 20/2006/A, of June 6: Aproves the Sectorial Plan of the Natura 2000 Network in the Azores Autonomous Region (corrected by the "Declaração de Rectificação No. 48-A/2006, of August 7").

(2007) Regional Legislative Decree No. 7/2007/A, of April 10: First amendment to the "Regional Legislative Decree No. 20/2006/A, of June 6" which approved the Sectorial Plan of Natura 2000 of the Autonomous Region of the Azores.

(2007) Regional Legislative Decree No. 15/2007/A, of June 25: Natural Park of Flores Island - recasting of the legal regime of classification, administration and management of protected areas in the Azores, repealing the "Regional Legislative Decree No. 21/93/A, of December 23", which adapted to the Autonomous Region the "Decreto – Law No. 19/93, of January 21" amended by "Decreto – Law No. 115/2005, of July 18" concerning the National Network of Protected Áreas.

Territory Management

(1984) Ordinance No. 30/84: approved the Regulation for the Urbanization Plan of Santa Cruz das Flores in order to guide the urban development.

(1986) The Regional Agricultural Reserve (RAR) was established by the publication of the Regional Legislative Decree No. 7/86/A, of March 11 amended by the Regional Legislative Decree No. 11/89/A, of July 27.

(1992) Ordinance No. 1/92, of January 2: approves the letter of Regional Agricultural Reserve (RAR) of the Azores.

(1998) Regional Legislative Decree No. 18/98/A, of November 9: Adapts the Decree-law No. 309/93, of September 2 to the Azores.

(2000) Regional Legislative Decree No. 14/2000/A, of May 23, ammended by the Regional Legislative Decree No. 24/2003/A, of May 12: adaptation to the Region of the Decree-law No. 380/99, of September 22, with the subsequent changes: Regional Plan for Territorial Planning within the National System of Territorial Planning.

(2000) Resolution No. 138/2000, of August 17: Approves the guidelines for coastal interventions for the Autonomous Region of the Azores.

(2000) Resolution No. 102/2000, of July 6: Coada is the only classified set of buildings of Flores Island. The reasons for the classification relate to its history, architecture, landscape, construction homogeneity and formal architectural link to the agricultural activity.

(2003) Regional Legislative Decree No. 18/2003/A: approved the new statute for Ground Communications Pathways of the Autonomous Region of the Azores.

(2003) Regional Legislative Decree No. 19/2003/A, of April 23: Approves the Regional Water Plan of the Azores Autonomous Region.

(2003) Resolution No. 43/2003, of April 10: the Government requires the legal and methodological reassessment of the proposed Regional Territorial Planning Act for the Autonomous Region of the Azores (PROTAA).

(2003) Regional Legislative Decree No. 24/2003/A, of May 12: Second amendment to the Regional Legislative Decree No. 14/2000/A, of May 23 amended by the Regional Legislative Decree No. 11/2002/A, of April 11 republished by the Regional Legislative Decree No. 38/2002/A, of December 3.

(2004) Government Council Resolution No. 110/2004, of July 29: Approves the Regional Plan for the Eradication and Control of Invasive Plant Species in Vulnerable Areas, as well as its implementation.

(2005) Government Council Resolution No. 103/2005, of June 16: Establishes the elaboration of a Sectorial Plan for the Volcanic Caves and the Natural Regional Monuments in the Azores Autonomous Region.

(2006) Regional Regulatory Decree No. 32/2006/A: Municipal Director Plan of Santa Cruz das Flores.

(2007) Regional Regulatory Decree No. 3/2007/A: Municipal Director Plan of Lajes das Flores.

(2007) Regional Legislative Decree No. 19/2007/A, of July 23: Creates the Support Subsystem for the Development of Tourism.

(2007) Regional Legislative Decree No. 19/2007/A, of July 23: Incentive System for the Regional Development of the Azores (SIDER).

(2007) Regional Legislative Decree No. 23/2007/A, of October 23: Regulation for Nautical tourism Activities of the Azores.

(2007) Regional Regulatory Decree No. 21/2007/A, of October 24: Regulates the Support Subsystem for the Development of Tourism.

(2008) POOC of Flores (Plan for Coastal Development): defines areas of protection of the coast and cliffs, and regulates the occupation, construction, use and transformation of its terrestrial component.

19.2.2. National legislation

Fisheries and Related Activities

(1987) Regulatory Decree No. 43/87, of July 17: Defines the national measures for the conservation of the biological resources applicable in the exercise of fisheries in oceanic and interior waters under Portuguese jurisdiction and sovereignty.

(1987) Decree-law No. 278/87, of July 7: Establishes the legal framework for the exercise of fisheries and marine cultures in waters under Portuguese jurisdiction and sovereignty.

(1998) Decree-law No. 383/98, of November 27: Changes the Decree-law No. 278/87, of July 7, about penalties regarding fisheries and marine cultures.

(2000) Regulatory Decree No. 7/2000, of May 30: Changes the Regulatory Decree No. 43/87, of July 17, that establishes the national capture sizes for fisheries in waters under Portuguese jurisdiction and sovereignty.

(2000) Decree-law No. 246/2000, of September 29: Defines the legal framework for the exercise of marine recreational fishing.

(2000) Ordinance No. 1102-B/2000, of November 22: Approves the Regulation for cathes.

(2000) Ordinance No. 1102-H/2000 of November 22 – Approves the Regulation for gill netting.

(2001) Ordinance No. 386/2001, of April 14: Changes the document Ordinance No. 1102-H/2000, of November 22 (approves the Regulation for gill netting).

(2001) National Ordinance No. 27/2001, January 15: Establishes minimum capture sizes for fish, crustaceans and moluscs, according to the Article nº48 of the

Regulatory Decree No. 43/87, of July 17, in the text given by the Regulatory Decree No. 7/2000, of May 30.

(2002) Ordinance No. 402/2002, of April 18: Changes the Annex to the Ordinance No. 27/2001, of January 15, regarding the minimum capture sizes for the flounder, black drum and lobster.

Environment Conservation

(1980) Decree No. 103/80, of October 11: Approves for ratification the Convention on the Conservation of Migratory Species of Wild Animals (Bona Convention).

(1993) Decree-law No. 19/93, of January 23: Establishes the rules regarding the National Network of Protected Areas.

(1999) Decree-law No. 140/99, of April 24: Reviews the transposition of the EU Directive No. 79/409/CEE, of April 2, (regarding the conservation of wild birds), and the Directive No. 92/43/CEE, of May 21 (regarding the conservation of natural habitats and wild fauna and flora) to the internal right.

(1989) Decree-law No. 316/89, of September 22 – Regulates the application of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention).

(1990) Decree-law No. 114/90, of April 5 – Promotes the application of the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES).

(2005) Decree-law No. 49/2005, of February 24: First change to the Decree-law No. 140/99, of April 24, regarding the conservation of wild birds (Birds Directive) and the conservation of natural habitats and wild fauna and flora (Habitats Directive).

Territory Management

(1977) Law No. 33/77, of May 28: Establishes the width and limits of the territorial sea and an Economic Exclusive Zone of 200 miles for Portugal.

(1978) Decree-law No. 119/78, of June 1: Defines «Exclusive Economic Zone» and defines its limits.

(1979) Law No. 173/99, of September 21: Fundamental hunting law.

(1993) Decree-law No. 309/93, of September 2, amended by the Decree-law No. 218/94, of August 20, Decree-law No. 151/95, of June 24 and Decreto-Lei.º 113/97, of May 10 it regulates the development and approval of development plans for the coastline.

(1999) Decree-law No. 380/99, of September 22: National Program Policy for Spatial Planning (PNPOT) which aims to implement the strategy for planning, development and territorial cohesion of the country.

(2000) Decree-law No. 53/2000, of April 7: Alters the Decree-law No. 380/99, of September 22.

(2002) Decree-law No. 202/2004, of August 18: Establishes the juridical regimen for the conservation and exploitation of hunting resources, aiming at its sustainable management, and sets the principles regulating the hunting activity.

(2003) Decree-law No. 310/2003, of December 10: Second amendment to the legal instruments for territorial management, approved by the Decree-law No. 380/99, of September 22.

(2005) Law No. 58/2005, of December 29: approves the Water Law by transposing the Directive No. 2000/60/CE of the European Parliament and Council, of October 23 to the national law, and establishes the basis and institutional framework for the sustainable management of water.

(2007) Decree-law No. 16/2007, of January 22: Establishes the juridical regimen for the recreational diving.

(2007) Law No. 56/2007, of August 31: Fourth amendment to the Decree-law No. 380/99, of September 22.

(2007) Decree-law No. 316/2007, of September 19: Fifth Amendment to the Decree-law No. 380/99, of September 22.

19.2.3. European legislation

Fisheries and Related Activities

(1998) Council Regulation (EC) No. 850/98, of March 30: Conservation of fishing resources through technical measures to protect the juveniles of marine organisms.

Environment Conservation

(1979) Council Directive No. 79/409/CEE, of April 2: Relates to the conservation of wild birds (Birds Directive).

(1991) Directive of the Commission No. 91/244/CEE, of March 6: Changes the Directive No. 79/409/CEE, regarding the conservation of wild birds (Birds Directive).

(1991) Council Directive No. 91/676/CEE, of December 12: Relates to the protection of waters against pollution caused by nitrates of agricultural origin.

(1992) Council Directive No. 92/43/CEE, of May 21: Relates to the conservation of natural habitats and wild fauna and flora (Habitats Directive).

(1994) Council Directive 94/24/CE, of June 8: Changes the Annex II of Directive No. 79/409/CEE, regarding the conservation of wild birds (Birds Directive).

(1997) Council Directive 97/62/CE, of October 27: Relates to the adaptation to the scientific and technical progress of Directive No. 92/43/CEE regarding the conservation of natural habitats and wild fauna and flora (Habitats Directive).

(1997) Commission Directive No. 97/49/CE, of June 29: Changes the Directive No. 79/409/CEE regarding the conservation of wild birds (Birds Directive).

(2002) Commission Decision No. 2002/11/CE, of December 28: Adopts the list of Sites of Community Importance to the biogeographic Macaronesian Region, on the terms of the Directive No. 92/43/CEE.

19.3. SPECIES LISTS

19.3.1. Kingdom Monera – 32 species

Aeromonas hydrophila (Chester 1901) Stanier 1943
Aeromonas salmonicida (Lehmann and Neumann 1896) Griffin et al. 1953
Aeromonas sobria Popoff and Veron 1981
Alcaligenes faecalis Castellani and Chalmers 1919 emend. Rehfuss and Urban 2005
Chromobacterium violaceum Bergonzini 1880
Enterobacter aerogenes Hormaeche and Edwards 1960
Enterobacter agglomerans Ewing and Fife 1972
Enterobacter cloacae (Jordan 1890) Hormaeche and Edwards 1960
Escherichia coli (Migula 1895) Castellani and Chalmers 1919
Flavobacterium odoratum Stutzer 1929
Hafnia alvei Moller 1954
Klebsiella oxytoca (Flügge 1886) Lautrop 1956
Klebsiella pneumoniae (Schroeter 1886) Trevisan 1887
Proteus mirabilis Hauser 1885
Proteus vulgaris Hauser 1885
Providencia rettgeri (Hadley et al. 1918) Brenner et al. 1978
Pseudomonas aeruginosa (Schroeter 1872) Migula 1900
Pseudomonas cepacia Palleroni and Holmes 1981
Pseudomonas fluorescens Migula 1895
Pseudomonas luteola Kodama et al. 1985
Pseudomonas paucimobilis Holmes et al. 1977
Pseudomonas putida (Trevisan 1889) Migula 1895
Serratia liquefaciens (Grimes and Hennerty 1931) Bascomb et al. 1971
Serratia marcescens Bizio 1823
Serratia odorifera Grimont et al. 1978
Serratia plymuthica (Lehmann and Neumann 1896) Breed et al. 1948
Vibrio alginolyticus (Miyamoto et al. 1961) Sakazaki 1968
Vibrio fluvialis Lee et al. 1981
Vibrio metschnikovii Gamaleia 1888
Vibrio parahaemolyticus (Fujino et al. 1951) Sakazaki et al. 1963
Xanthomonas maltophilia (Hugh 1981) Swings et al. 1983
Yersinia enterocolitica (Schleifstein and Coleman 1939) Frederiksen 1964

19.3.2. Kingdom Protista – 8 species

Miniacina miniacea Pallas, 1766
Acanthocorys umbellifera (Haeckel,1862)
Clathrocyclas danaes Haeckel,1887
Eponides repandus (Fichtel & Moll, 1798)
Heliosphaera actinota Haeckel,1862
Sethopera oceania (Ehrenberg,1872)
Sorosphaera confusa Brady, 1879
Uvigerina canariensis d´Orbigny, 1839

19.3.3. Kingdom Fungi – 2 species

Lichina pygmaea (Lightfoot) C. Agardh
Byssoloma subdiscordans (Nyl.) P. James

19.3.4. Kingdom Plantae – 922 species

Rhodophyta - 86 species

Acrosorium venulosum (Zanardini) Kylin

Aglaothamnion bipinnatum (P.L. Crouan & H.M. Crouan) Feldmann-Mazoyer
Aglaothamnion tenuissimum (Bonnemaison) Feldmann-Mazoyer
Amphiroa beauvoisii J.V. Lamouroux
Amphiroa rigida J.V. Lamouroux
Apoglossum ruscifolium (Turner) J. Agardh
Asparagopsis armata Harvey
Asparagopsis taxiformis (Delile) Trevisan de Saint-Léon
Boergeseniella fruticulosa (Wulfen) Kylin
Bonnemaisonia cf. *hamifera* Hariot
Bornetia secundiflora (J. Agardh) Thuret
Callithamnion corymbosum (Smith) Lyngbye
Caulacanthus ustulatus (Mertens ex Turner) Kützing
Centroceras clavulatum (C. Agardh) Montagne
Ceramium ciliatum (J. Ellis) Ducluzeau
Ceramium cimbricum H.E. Petersen
Ceramium derbesii Solier ex Kützing
Ceramium diaphanum (Lightfoot) Roth
Ceramium gaditanum (Clemente y Rubio) Cremades
Ceramium virgatum Roth
Champia parvula (C. Agardh) Harvey
Chondracanthus acicularis (Roth) Fredericq
Chondria capillaris (Hudson) M.J. Wynne
Chondria dasyphylla (Woodward) C. Agardh
Corallina elongata J. Ellis & Solander
Corallina officinalis Linnaeus
Cruoria pellita (Lyngbye) Fries
Cryptopleura ramosa (Hudson) L. Newton
Erythrodermis traillii (Holmes ex Batters) Guiry & Garbary
Erythrotrichia carnea (Dillwyn) J. Agardh
Gelidiella tinerfensis Seoane-Camba
Gelidiopsis intricata (C. Agardh) Vickers
Gelidium corneum (Hudson) J.V. Lamouroux
Gelidium microdon Kützing
Gelidium pusillum (Stackhouse) Le Jolis
Gelidium spinosum (S.G.Gmelin) P.C. Silva
Gigartina pistillata (S.G. Gmelin) Stackhouse
Gracilaria gracilis (Stackhouse) M. Steentoft, L.M. Irvine & W.F. Farnham
Grateloupia filicina (J.V. Lamouroux) C. Agardh
Griffithsia corallinoides (Linnaeus) Trevisan
Griffithsia devoniensis Harvey
Gymnogongrus crenulatus (Turner) J. Agardh
Gymnogongrus griffithsiae (Turner) C.F.P. Martius
Gymnothamnion elegans (Schousboe ex C. Agardh) J. Agardh
Haliptilon virgatum (Zanardini) Garbary & H.W. Johansen
Halurus flosculosus (J. Ellis) Maggs & Hommersand
Hypnea musciformis (Wulfen) J.V. Lamouroux
Hypnea spinella (C. Agardh) Kützing
Jania adhaerens J.V. Lamouroux
Jania longifurca Zanardini
Jania rubens (Linnaeus) J.V. Lamouroux
Kallymenia reniformis (Turner) J. Agardh
Laurencia obtusa (Hudson) J.V. Lamouroux
Liagora divaricata C.K. Tseng
Lithophyllum tortuosum (Esper) Foslie
Lomentaria articulata (Hudson) Lyngbye
Melobesia membranacea (Esper) J.V. Lamouroux
Nemalion helminthoides (Velley) Batters
Osmundea hybrida (A.P. de Candolle) K.W. Nam
Osmundea pinnatifida (Hudson) Stackhouse
Peyssonnelia squamaria (S.G.Gmelin) Decaisne
Phyllophora crispa (Hudson) P.S. Dixon
Plocamium cartilagineum (Linnaeus) P.S. Dixon
Polysiphonia atlantica Kapraun & J.N. Norris
Polysiphonia brodiaei (Dillwyn) Sprengel
Polysiphonia denudata (Dillwyn) Greville ex Harvey
Polysiphonia fibrillosa (Dillwyn) Sprengel
Polysiphonia fucoides (Hudson) Greville
Polysiphonia havanensis Montagne
Polysiphonia opaca (C. Agardh) Moris & De Notaris
Polysiphonia stricta (Dillwyn) Greville
Porphyra sp. C. Agardh
Pterocladiella capillacea (S.G.Gmelin) Santelices & Hommersand
Pterothamnion crispum (Ducluzeau) Nägeli
Rhodochorton purpureum (Lightfoot) Rosenvinge
Rhodophyllis divaricata (Stackhouse) Papenfuss
Rhodymenia holmesii Ardissone
Rhodymenia pseudopalmata (J.V. Lamouroux) P.C. Silva
Schimmelmannia schousboei (J. Agardh) J. Agardh
Schizymenia dubyi (Chauvin ex Duby) J. Agardh
Schottera nicaeënsis (J.V. Lamouroux ex Duby) Guiry & Hollenberg
Scinaia sp. Bivona-Bernardi
Sphaerococcus coronopifolius Stackhouse
Spyridia filamentosa (Wulfen) Harvey
Stenogramme interrupta (C. Agardh) Montagne ex Harvey
Symphyocladia marchantioides (Harvey) Falkenberg

Ochrophyta - 25 species

Aglaozonia parvula Phase (Greville) Zanardini
Ascophyllum nodosum (Linnaeus) Le Jolis
Bachelotia antillarum (Grunow) Gerloff
Carpomitra costata (Stackhouse) Batters
Cladostephus spongiosus (Hudson) C. Agardh
Colpomenia sinuosa (Mertens ex Roth) Derbès & Solier
Cutleria multifida (Turner) Greville
Cystoseira foeniculacea (Linnaeus) Greville
Cystoseira humilis Schousboe ex Kützing
Dictyopteris polypodioides (De Candolle) J.V. Lamouroux
Dictyota adnata Zanardini
Dictyota bartayresiana J.V. Lamouroux
Dictyota dichotoma (Hudson) J.V. Lamouroux
Fucus spiralis Linnaeus
Halopteris filicina (Grateloup) Kützing
Leathesia difformis (Linnaeus) J.E. Areschoug
Liebmannia leveillei J. Agardh
Myrionema strangulans Greville
Padina pavonia (Linnaeus) Thivy
Sargassum cymosum C. Agardh
Sargassum vulgare C. Agardh
Stypocaulon scoparium (Linnaeus) Kützing
Stypopodium zonale (J.V. Lamouroux) Papenfuss
Taonia atomaria (Woodward) J. Agardh
Zonaria tournefortii (J.V. Lamouroux) Montagne

Chlorophyta - 28 species

Anadyomene stellata (Wulfen) C.Agardh
Blidingia minima (Nägeli ex Kützing) Kylin
Bryopsis hypnoides J.V. Lamouroux
Bryopsis plumosa (Hudson) C. Agardh
Chaetomorpha aerea (Dillwyn) Kützing
Chaetomorpha linum (O.F. Müller) Kützing
Chaetomorpha pachynema (Montagne) Kützing
Cladophora albida (Nees) Kutzing
Cladophora coelothrix Kützing
Cladophora laetevirens (Dillwyn) Kützing
Cladophora prolifera (Roth) Kützing
Cladophoropsis membranacea (Hofman Bang ex C. Agardh) Kützing
Codium adhaerens C. Agardh
Codium decorticatum (Woodward) M.A. Howe
Codium fragile subsp. *atlanticum* (A.D. Cotton) P.C. Silva
Codium tomentosum Stackhouse
Derbesia marina (Lyngbye) Solier
Halicystis ovalis Phase (Lyngbye) Areschoug
Microdictyon calodictyon (Montagne) Kützing
Pedobesia simplex (Meneghini ex Kützing) M.J. Wynne & Leliaert
Phyllodictyon anastomosans (Harvey) Kraft & M.J. Wynne
Rhizoclonium tortuosum (Dillwyn) Kützing
Ulva clathrata (Roth) C. Agardh
Ulva intestinalis Linnaeus
Ulva lactuca Linnaeus
Ulva prolifera O.F. Müller
Urococcus hookerianus (Berk. & Hassall) Kutzing
Valonia utricularis (Roth) C. Agardh

Bryophyta – 250 species

Adelanthus decipiens (Hook.) Mitt.
Alophosia azorica (Renauld *et* Cardot) Cardot
Amblystegium humile (P. Beauv.) Lindb.
Amblystegium varium (Hedw.) Lindb.
Amphidium mougeotii (Bruch *et* Schimp.) Schimp.
Anastrophyllum minutum (Schreb.) R. M. Schust.
Andoa berthelotiana (Mont.) Ando
Aneura pinguis (L.) Dumort.
Anomobryum julaceum (P. Gaertn., B. Mey. *et* Scherb.) Schimp.
Anthoceros caucasicus Steph.
Anthoceros punctatus L.
Aphanolejeunea azorica (V. Allorge *et* Ast) Pócs *et* Bernecker
Aphanolejeunea microscopica (Taylor) A. Evans
Aphanolejeunea sintenisii Steph.
Asterella africana (Mont.) A. Evans
Atrichum angustatum (Schimp.) Bartr.
Atrichum undulatum (Hedw.) P. Beauv.
Barbula unguiculata Hedw.
Bartramia stricta Brid.
Bazzania azorica H. Buch *et* Perss.
Blepharostoma trichophyllum (L.) Dumort.
Blindia acuta (Hedw.) Bruch *et* Schimp.

Brachymenium notarisii (Mitt.) A. J. Shaw
Brachythecium plumosum (Hedw.) Schimp.
Brachythecium populeum (Hedw.) Schimp.
Brachythecium rivulare Schimp.
Brachythecium rutabulum (Hedw.) Schimp.
Brachythecium salebrosum (F. Weber *et* D. Mohr) Schimp.
Brachythecium velutinum (Hedw.) Schimp.
Breutelia azorica (Mitt.) Cardot
Bryum alpinum Huds. *ex* With.
Bryum argenteum Hedw.
Bryum bicolor Dicks.
Bryum caespiticium Hedw.
Bryum canariense Brid.
Bryum capillare Hedw.
Bryum creberrimum Taylor
Bryum donianum Grev.
Bryum gemmiparum De Not.
Bryum pseudotriquetrum (Hedw.) P. Gaertn., B. Mey. *et* Scherb.
Bryum torquescens De Not.
Calliergonella cuspidata (Hedw.) Loeske
Calypogeia arguta Nees *et* Mont.
Calypogeia azorica Bischl.
Calypogeia fissa (L.) Raddi
Calypogeia integristipula Steph.
Calypogeia muelleriana (Schiffn.) Müll Frib.
Calypogeia neesiana (Massal. *et* Carestia) Müll Frib.
Calypogeia sphagnicola (Arnell *et* Perss) Warnst. *et* Loeske
Calypogeia suecica (Arnell *et* Perss.) Müll Frib.
Campylopus brevipilus Bruch et Schimp.
Campylopus cygneus (Hedw.) Brid.
Campylopus flexuosus (Hedw.) Brid.
Campylopus fragilis Bruch et Schimp.
Campylopus incrassatus Müll Hal.
Campylopus introflexus (Hedw.) Brid.
Campylopus pilifer Brid.
Campylopus pyriformis (Schultz.) Brid.
Campylopus shawii Wilson
Cephalozia bicuspidata (L.) Dumort.
Cephalozia crassifolia (Lindenb. *et* Gottsche) Fulford
Cephaloziella dentata (Raddi) Steph.
Cephaloziella divaricata (Sm.) Schiffn.
Ceratodon purpureus (Hedw.) Brid.
Chiloscyphus coadunatus (Sw.) J. J. Engel *et* R. M. Schust.
Chiloscyphus fragans (Moris et De Not.) J. J. Engel *et* R. M. Schust.
Chiloscyphus profundus (Nees) J. J. Engel *et* R. M. Shust.
Cololejeunea minutissima (Sm.) Schiffn.
Colura calyptrifolia (Hook.) Dumort.
Conocephalum conicum (L.) Dumort.
Corsinia coriandrina (Spreng.) Lindb.
Dicranella heteromalla (Hedw.) Schimp.
Dicranella howei Renauld et Cardot
Dicranoweisia crispula (Hedw.) Lindb. *ex* Milde
Dicranum scottianum Turn.
Didymodon tophaceus (Brid.) Lisa
Diphyscium foliosum (Hedw.) Mohr
Diplophyllum albicans (L.) Dumort.
Drepanocladus fluitans (Hedw.) Warnst.
Drepanolejeunea hamatifolia (Hook.) Schiffn.
Dumortiera hirsuta (Sw.) Nees
Echinodium prolixum (Mitt.) Broth.
Echinodium renauldii (Cardot) Broth.
Entosthodon attenuatus (Dicks.) Bryhn
Entosthodon obtusus (Hedw.) Lindb.
Epipterygium tozeri (Grev.) Lindb.
Eucladium verticillatum (Brid.) Bruch *et* Schimp.
Eurhynchium hians (Hedw.) Loeske
Eurhynchium meridionale (Schimp. *ex* Sendt.) De Not.
Eurhynchium praelongum (Hedw.) Warnst.
Eurhynchium pumilum (Wilson) Schimp.
Exormotheca pustulosa Mitt.
Fissidens asplenioides Hedw.
Fissidens azoricus (P. de la Varde) Bizot
Fissidens bryoides Hedw. *sensu latiore*
Fissidens crassipes Wilson *ex* Bruch *et* Schimp.
Fissidens curvatus Hornsch.
Fissidens dubius P. Beauv.
Fissidens ovatifolius R. Ruthe
Fissidens serrulatus Brid.
Fissidens taxifolius Hedw.
Fontinalis antipyretica Hedw.
Fossombronia angulosa (Dicks.) Raddi
Fossombronia pusilla (L.) Nees
Frullania azorica Sim-Sim *et al.*
Frullania microphylla (Gottsche) Pearson
Frullania tamarisci (L.) Dumort.
Frullania teneriffae (F. Weber) Nees
Geocalyx graveolens (Schrad.) Nees
Glyphomitrium daviesii (Dicks.) Brid.
Gongylanthus ericetorum (Raddi) Nees
Grimmia lisae De Not.
Grimmia pulvinata (Hedw.) Sm.
Gymnostomum calcareum Nees *et* Hornsch.
Harpalejeunea molleri (Steph.) Grolle
Herbertus sendtneri (Nees) Lindb.
Heterocladium heteropterum (Brid.) Schimp.
Heteroscyphus denticulatus (Mitt.) Schiffn.

Homalia webbiana (Mont.) Düll
Hookeria lucens (Hedw.) Sm.
Hypnum cupressiforme Hedw.
Hypnum imponens Hedw.
Hypnum jutlandicum Holmen *et* E. Warncke
Hypnum resupinatum Taylor
Hypnum uncinulatum Jur.
Isothecium myosuroides Brid.
Jubula hutchinsiae (Hook.) Dumort.
Jubula hutchinsiae ssp. *hutchinsiae* (Hook.) Dumort.
Jungermannia atrovirens Dumort.
Jungermannia callithrix Lindenb. *et* Gottsche
Jungermannia gracillima Sm.
Kurzia pauciflora (Dicks.) Grolle
Lejeunea eckloniana Lindenb.
Lejeunea flava (Sw.) Nees
Lejeunea flava ssp. *moorei* (Lindb.) R. M. Schust.
Lejeunea hibernica Bischl. *et al.* ex Grolle
Lejeunea lamacerina (Steph.) Schiffn.
Lejeunea patens Lindb.
Lepidozia cupressina (Sw.) Lindenb.
Lepidozia reptans (L.) Dumort.
Leptoscyphus azoricus (H. Buch *et* Perss.) Grolle
Leucobryum albidum (P. Beauv.) Lindb.
Leucobryum glaucum (Hedw.) Angstr.
Leucobryum juniperoideum (Brid.) Müll Hal.
Leucodon treleasei (Cardot) Par.
Lophozia incisa (Schrad.) Dumort.
Lophozia longiflora (Nees) Schiffn.
Lophozia ventricosa (Dicks.) Dumort.
Lunularia cruciata (L.) Lindb.
Mannia androgyna (L.) A. Evans
Marchantia paleacea Bertol.
Marchesinia mackaii (Hook.) Gray
Marsupella emarginata (Ehrh.) Dumort.
Marsupella funckii (F. Weber *et* D. Mohr) Dumort.
Marsupella sphacelata (Gieseke *ex* Lindenb.) Dumort.
Metzgeria furcata (L.) Dumort.
Metzgeria leptoneura Spruce
Microcampylopus laevigatus (Thér.) Giese *et* Frahm
Microlejenea ulicina (Taylor) Gottsche *et al.*
Mnioloma fuscum (Lehm.) R. M. Schust.
Mnium hornum Hedw.
Myurium hochstetteri (Schimp.) Kindb.
Nardia geoscyphus (De Not.) Lindb.
Nardia scalaris Gray
Neckera intermedia Brid.
Nowellia curvifolia (Dicks.) Mitt.
Odontochisma denudatum (Mart.) Dumort.
Odontochisma prostratum (Sw.) Trevis.
Orthotrichum diaphanum Brid.
Pellia epiphylla (L.) Corda
Phaeoceros bulbiculosus (Brot.) Prosk.
Phaeoceros laevis (L.) Prosk.
Phaeoceros laevis ssp. *laevis* (L.) Prosk.
Philonotis caespitosa Jur.
Philonotis hastata (Duby) Wijk *et* Margad.
Philonotis rigida Brid.
Plagiochila bifaria (Sw.) Lindenb.
Plagiochila exigua (Taylor) Taylor
Plagiochila longispina Lindenb. *et* Gottsche
Plagiomnium rostratum (Schrad.) T. J. Kop.
Plagiomnium undulatum (Hedw.) T. J. Kop.
Plagiothecium nemorale (Mitt.) A. Jaeger
Platyhypnidium riparioides (Hedw.) Dixon
Pleuridium acuminatum Lindb.
Pogonatum aloides (Hedw.) P. Beauv.
Pohlia andalusica (Höhn.) Broth.
Pohlia proligera (Kindb.) Broth.
Polytrichum commune Hedw.
Polytrichum formosum Hedw.
Polytrichum juniperinum Hedw.
Polytrichum piliferum Hedw.
Porella canariensis (F. Weber) Bryhn
Porella obtusata (Taylor) Trevis.
Pottia truncata (Hedw.) Bruch *et* Schimp.
Pseudephemerum nitidum (Hedw.) Reim.
Pseudotaxiphyllum elegans (Brid.) Z. Iwats.
Pterogonium gracile (Hedw.) Sm.
Ptychomitrium nigrescens (Kunze) Wijk *et* Marg.
Ptychomitrium polyphyllum Bruch *et* Schimp.
Racomitrium aciculare (Hedw.) Brid.
Racomitrium aquaticum (Brid. *ex* Schrad.) Brid.
Racomitrium heterostichum (Hedw.) Brid.
Radula aquilegia (Hook. f. *et* Taylor) Gottsche *et* al.
Radula carringtonii J. B. Jack
Radula holtii Spruce
Radula lindenbergiana Gottsche *ex* C. Hartman
Radula wichurae Steph.
Reboulia hemisphaerica (L.) Raddi
Rhabdoweisia fugax (Hedw.) Bruch *et* Schimp.
Rhamphidium purpuratum Mitt.
Rhynchostegiella curviseta (Brid.) Limpr.
Rhynchostegiella durieui (Mont.) P. Allorge *et* Perss.
Rhynchostegium confertum (Dicks.) Schimp.
Rhytidiadelphus squarrosus T. J. Kop.
Riccardia chamedryfolia (With.) Grolle
Riccardia latifrons (Lindb.) Lindb.

Riccardia multifida (L.) Gray
Riccardia palmata (Hedw.) Carruth.
Riccia crozalsii Levier
Saccogyna viticulosa (L.) Dumort.
Scapania curta (Mart.) Dumort.
Scapania gracilis Lindb.
Scapania undulata (L.) Dumort.
Schistidium alpicola (Hedw.) Limpr.
Scleropodium purum (Hedw.) Limpr.
Scorpiurium circinatum (Brid.) M. Fleisch. *et* Loeske
Sematophyllum substrumulosum (Hampe) Britton
Sphagnum denticulatum Brid.
Sphagnum girgensohnii Russow
Sphagnum magellanicum Brid.
Sphagnum palustre L.
Sphagnum papillosum Lindb.
Sphagnum squarrosum Crome
Sphagnum subnitens Russow *et* Warnst.
Targionia hypophylla L. *sensu latiore*
Telaranea europaea Engel *et* Merr.
Tetrastichium fontanum (Mitt.) Cardot
Tetrastichium virens (Cardot) Churchill
Thamnobryum alopecurum (Hedw.) Gangulee
Thuidium tamariscinum (Hedw.) Schimp.
Tortella nitida (Lindb.) Broth.
Tortula cuneifolia (Dicks.) Turner
Tortula marginata (Bruch *et* Schimp.) Spruce
Tortula muralis Hedw.
Tortula solmsii (Schimp.) Limpr.
Trichostomum brachydontium Bruch
Trichostomum crispulum Bruch
Tylimanthus azoricus Grolle et Perss.
Weissia controversa Hedw.
Zygodon viridissimus (Dicks.) Brid.

Pteridophyta - 50 species

Adiantum capillus-veneris L.
Adiantum hispidulum Sw.
Adiantum raddianum C. Presl
Anogramma leptophylla (L.) Link
Asplenium azoricum (Milde) Lovis, Rasbach & Reichstein
Asplenium hemionitis L.
Asplenium marinum L.
Asplenium monanthes L.
Asplenium obovatum Viv. ssp. *lanceolatum* (Fiori) P. Silva
Asplenium onopteris L.
Asplenium scolopendrium L.
Asplenium trichomanes L. ssp. *quadrivalens* D. E. Mey. emend. Lovis
Athyrium filix-femina (L.) Roth
Blechnum spicant (L.) Roth
Ceradenia jungermannioides (Klotzsch) Bishop
Christella dentata (Forssk.) Brownsey & Jermy
Culcita macrocarpa C. Presl
Cyrtomium falcatum (L. fil.) C. Presl
Cystopteris diaphana (Bory) Blasdell
Deparia petersenii (Kunze) M. Kato
Diphasiastrum madeirense (J. H. Wilce) Holub
Diplazium caudatum (Cav.) Jermy
Diphasium madeirense (J.Wilce) Rothm.
Dryopteris aemula (Aiton) O. Kuntze
Dryopteris affinis (Lowe) Fraser-Jenkins ssp. *affinis*
Dryopteris azorica (Christ) Alston
Dryopteris crispifolia Rasbach, Reichstein & Vida
Elaphoglossum semicylindricum (Bowdich) Benl
Equisetum telmateia Ehrh.
Grammitis marginella (Sw.) Sw. ssp. *azorica* H. Schäfer
Huperzia dentata (Herter) Holub
Huperzia suberecta (Lowe) Tardieu
Hymenophyllum tunbrigense (L.) Sm.
Hymenophyllum wilsonii Hook.
Isoetes azorica Durieu *ex* Milde
Lycopodiella cernua (L.) Pichi-Sermolli
Lycopodiella inundata (L.) Holub
Nephrolepis cordifolia (L.) C. Presl
Ophioglossum azoricum C. Presl
Ophioglossum lusitanicum L.
Oreopteris limbosperma (All.) Holub
Osmunda regalis L.
Polypodium azoricum (Vasc) R. Fern.
Polystichum setiferum (Forssk.) Woyn.
Pteridium aquilinum (L.) Kuhn
Pteris incompleta Cav.
Selaginella kraussiana (Kunze) A. Braun
Sphaeropteris cooperi (Hook. & Mueller) Tryon
Stegnogramma pozoi (Lag.) K. Iwats.
Trichomanes speciosum Willd.
Woodwardia radicans (L.) Sm.

Spermatophyta - 478 species

Acacia melanoxylon R. Br.
Acanthus mollis L.
Agave americana L.
Agrimonia eupatoria L.
Agrostis azorica (Hochst.) Tutin & Warb.
Agrostis castellana Boiss. & Reut.
Agrostis congestiflora Tutin & Warb. ssp. *congestiflora*
Agrostis congestiflora Tutin & Warb. ssp. *oreophila* Franco
Agrostis gracililaxa Franco
Agrostis reuteri Boiss. ssp. *botelhoi* Franco & Rocha Afonso
Agrostis stolonifera L.
Ailanthus altissima (Mill.) Swingle
Aira caryophyllea L. ssp. Caryophyllea
Aira caryophyllea L. ssp. *multiculmis* (Dumort.) Bonnier & Layens
Aira praecox L.
Allium ampeloprasum L.
Allium paniculatum L. ssp. *paniculatum*
Allium vineale L.
Alnus incana (L.) Moench
Alpinia zerumbet (Pers.) Burtt & R. M. Sm.
Amaranthus blitum L.
Amaranthus hybridus L.
Amaryllis belladonna L.
Ammi huntii H. C. Watson
Ammi majus L.
Ammi trifoliatum (H. C. Watson) Trel.
Anagallis arvensis L.
Anagallis minima L.
Anagallis tenella (L.) L.
Anethum graveolens L
Angelica lignescens Reduron & Danton
Anredera cordifolia (Ten.) Steenis
Anthemis cotula L.
Anthoxanthum odoratum L.
Antirrhinum majus L.
Aphanes microcarpa (Boiss. & Reut.) Rothm.
Apium graveolens L.
Apium nodiflorum (L.) Lag.
Aptenia cordifolia (L. fil.) Schwantes
Araujia sericifera Brot.
Arisarum vulgare O. Targ.-Tozz. ssp. *vulgare*
Armeria maritima (Mill.) Willd. ssp. *azorica* Franco
Armeria maritima (Mill.) Willd. ssp. *miscella* (Merino) Malag.
Arrhenatherum elatius (L.) P. Beauv. ex J. Presl. & C. Presl ssp. *bulbosum* (Willd.) Schübl. & Mart.
Arundo donax L.
Aster squamatus (Spreng.) Hieron.
Atriplex prostrata Boucher ex DC.
Avena barbata Pott ex Link
Avena byzantina K. Koch
Avena sterilis L. ssp. *ludoviciana* (Durieu) Nyman
Azorina vidalii (H. C. Watson) Feer
Barbarea verna (Mill.) Asch.
Bellis azorica Hochst. ex Seub.
Bidens pilosa L.
Borago officinalis L.
Brachypodium distachyon (L.) P. Beauv
Brachypodium sylvaticum (Huds.) P. Beauv.
Brassica nigra (L.) Koch
Brassica oleracea L.
Briza maxima L.
Briza minor L.
Bromus catharticus Vahl
Bromus diandrus Roth
Bromus madritensis L. ssp. *madritensis*
Buxus sempervirens L.
Calendula arvensis L.
Calendula officinalis L.
Callitriche stagnalis Scop.
Calluna vulgaris (L.) Hull
Calystegia sepium (L.) R. Br. ssp. *americana* (Sims) Brumm.
Calystegia sepium (L.) R. Br. ssp. *sepium*
Campanula erinus L.
Canna indica L.
Capsella rubella Reut.
Cardamine caldeirarum Guthn. ex Seub.
Cardamine hirsuta L.
Carex distans L.
Carex divulsa Stokes ssp. *divulsa*
Carex echinata Murray
Carex hochstetteriana Gay ex Seub.
Carex otrubae Podp.
Carex pairae F. W. Schultz
Carex pendula Huds.
Carex peregrina Link
Carex pilulifera L. ssp. *azorica* (Gay) Franco & Rocha Afonso
Carex punctata Gaudin
Carex viridula Michx. ssp. *cedercreutzii* (Fagerstr.) B. Schmid
Carex vulcani Hochst. ex Seub.
Carpobrotus edulis (L.) L. Bolus

Centaurium erythraea Rafn ssp. *grandiflorum* (Biv.) Melderis
Centaurium scilloides (L. fil.) Samp.
Centranthus ruber (L.) DC.
Cerastium azoricum Hochst.
Cerastium fontanum Baumg. ssp. *vulgare* (Hartm.) Greuter & Burd.
Cerastium glomeratum Thuill.
Cerastium vagans Lowe
Ceratophyllum demersum L.
Chaerophyllum azoricum Trel.
Chelidonium majus L.
Chenopodium album L.
Chenopodium ambrosioides L.
Chenopodium murale L.
Chlorophytum comosum (Thunb.) Jacq.
Chrysanthemum coronarium L.
Chrysanthemum segetum L.
Cichorium intybus L.
Cirsium arvense (L.) Scop.
Cirsium palustre (L.) Scop.
Cirsium vulgare (Savi) Ten.
Cladium mariscus (L.) Pohl ssp. mariscus
Clematis flammula L.
Clinopodium ascendens (Jord.) Samp.
Clinopodium vulgare L. ssp. *arundanum* (Boiss.) Nyman
Coleostephus myconis (L.) Rchb. fil.
Colocasia esculenta (L.) Schott
Consolida ajacis (L.) Schur
Convolvulus arvensis L.
Conyza bonariensis (L.) Cronquist
Conyza canadensis (L.) Cronquist
Coriandrum sativum L.
Coronopus didymus (L.) Sm.
Crassula multicava Lem.
Crassula tillaea Lest.-Garl.
Crepis capillaris (L.) Wallr.
Crinum moorei Hook. fil.
Crithmum maritimum L.
Cryptomeria japonica (L. fil.) D. Don
Cymbalaria muralis P. Gaertn., B. Mey. & Scherb.
Cynodon dactylon (L.) Pers.
Cynoglossum creticum Mill.
Cyperus eragrostis Lam.
Cyperus esculentus L.
Cyperus longus L.
Cyperus rotundus L.
Cytisus scoparius (L.) Link
Daboecia azorica Tutin & Warb.
Dactylis glomerata L.
Datura stramonium L.
Daucus carota L. ssp. *azoricus* Franco
Deschampsia foliosa Hack.
Digitalis purpurea L.
Digitaria ciliaris (Retz.) Koeler
Digitaria sanguinalis (L.) Scop.
Dittrichia viscosa (L.) Greuter
Dracaena draco (L.) L. ssp. *draco*
Drosanthemum floribundum (Haw.) Schwantes
Duchesnea indica (Andr.) Focke
Echinochloa crus-galli (L.) P. Beauv.
Echium plantagineum L.
Egeria densa Planchon
Eichhornia crassipes (Mart.) Solms-Laub.
Elaeagnus umbellata Thunb.
Elatine hexandra (Lapierre) DC.
Eleocharis multicaulis (Sm.) Desv.
Eleocharis palustris (L.) Roem. & Schult.
Eleusine indica (L.) P. Gaertn. ssp. *indica*
Epilobium obscurum Schreb.
Epilobium parviflorum Schreb.
Erica azorica Hochst. ex Seub.
Erigeron karvinskianus DC.
Eucalyptus globulus Labill.
Euphorbia azorica Seub.
Euphorbia lathyris L.
Euphorbia maculata L.
Euphorbia peplus L.
Euphorbia stygiana H. C. Watson
Euphrasia azorica H. C. Watson
Euphrasia grandiflora Hochst. ex Seub.
Fagopyrum dibotrys (D. Don) Hara
Festuca arundinacea Schreb. ssp. *mediterranea* (Hackel) Franco & Rocha Afonso
Festuca jubata Lowe
Festuca petraea Guthn. ex Seub.
Ficus carica L.
Ficus pumila L.
Filago gallica L.
Filago lutescens Jord. ssp. *atlantica* Wagenitz
Foeniculum vulgare Mill.
Fragaria vesca L.
Frangula azorica V. Grubov
Frankenia pulverulenta L.
Fuchsia magellanica Lam.
Fumaria muralis Sonder ex Koch ssp. *muralis*
Galinsoga parviflora Cav.
Galium aparine L.
Galium palustre L.
Galium parisiense L.
Gamochaeta purpurea (L.) Cabrera

Gastridium ventricosum (Gouan) Schinz & Thell.
Gaudinia coarctata (Link) Durand & Schinz
Gazania rigens (L.) P. Gaertn.
Geranium dissectum L.
Geranium molle L.
Geranium purpureum Vill.
Gladiolus carneus Delar.
Gladiolus natalensis Hook.
Glyceria declinata Bréb.
Gomphocarpus fruticosus (L.) R. Br.
Hebe salicifolia (G. Forst.) Pennell
Hedera azorica Carrière
Hedychium coronarium Koenig
Hedychium gardneranum Sheppard ex Ker-Gawl.
Helianthus annuus L.
Helianthus tuberosus L.
Helminthotheca echioides (L.) Holub
Hemerocallis lilioasphodelus L.
Holcus lanatus L.
Holcus rigidus Hochst.
Hordeum murinum L. ssp. *leporinum* (Link) Asch. & Graebn.
Hydrangea macrophylla (Thunb.) Ser.
Hydrocotyle vulgaris L.
Hypericum foliosum Aiton
Hypericum hircinum L.
Hypericum humifusum L.
Hypericum undulatum Schousb. ex Willd.
Hypochoeris radicata L.
Ilex perado Aiton ssp. *azorica* (Loes.) Tutin
Illecebrum verticilatum L.
Ipomoea indica (Burm. fil.) Merr.
Isolepis cernua (Vahl) Roem. & Schult.
Isolepis setacea (L.) R. Br.
Juncus acutus L.
Juncus articulatus L.
Juncus bufonius L.
Juncus bulbosus L.
Juncus capitatus Weigel
Juncus effusus L.
Juncus tenuis Willd.
Juniperus brevifolia (Seub.) Antoine
Kickxia elatine (L.) Dumort. ssp. *elatine*
Kickxia spuria (L.) Dumort. ssp. *spuria*
Kyllinga brevifolia Rottb.
Lactuca serriola L.
Lagurus ovatus L.
Lantana camara L.
Lapsana communis L.
Lathyrus aphaca L.
Laurus azorica (Seub.) Franco
Lavatera cretica L.
Leersia oryzoides (L.) Sw.
Leontodon filii (Hochst. ex Seub.) Paiva & Ormonde
Leontodon rigens (Dryand.) Paiva & Ormonde
Leontodon taraxacoides (Vill.) Mérat ssp. *longirostris* Finch & P. D. Sell
Leontodon taraxacoides (Vill.) Mérat ssp. *taraxacoides*
Lepidium virginicum L.
Leptospermum scoparium J. R. Forst. & G. Forst.
Leucanthemum vulgare Lam.
Ligustrum henryi Hemsl.
Ligustrum ovalifolium Hassk.
Littorella uniflora (L.) Asch.
Lobelia urens L.
Lobularia maritima (L.) Desv.
Lolium multiflorum Lam.
Lolium perenne L.
Lonicera japonica Thunb.
Lotus angustissimus L.
Lotus azoricus P. W. Ball.
Lotus corniculatus L.
Lotus parviflorus Desf.
Lotus pedunculatus Cav.
Lotus subbiflorus Lag.
Lunaria annua L.
Lupinus albus L.
Luzula multiflora (Retz.) Lej.
Luzula purpureosplendens Seub.
Lysimachia azorica Hornem. ex Hook.
Lythrum hyssopifolia L.
Lythrum junceum Banks & Sol.
Lythrum portula (L.) D. A. Webb
Malva nicaeensis All.
Marrubium vulgare L.
Matthiola incana (L.) R. Br. ssp. *incana*
Medicago lupulina L.
Melissa officinalis L.
Mentha aquatica L.
Mentha pulegium L.
Mentha spicata L.
Mentha suaveolens Ehrh.
Mercurialis annua L.
Metrosideros excelsa Sol. ex P. Gaertn.
Mirabilis jalapa L.
Misopates orontium (L.) Raf.
Mollugo verticillata L.
Muehlenbeckia sagittifolia (Ort.) Meissn.
Myosotis azorica S. Watson
Myosotis maritima Hochst. ex Seub.
Myosotis secunda Murray
Myosotis stolonifera (DC.) Gay ex Leresche & Levier ssp. *hirsuta* R. M. Schuster

Myrica faya Aiton
Myrsine africana L.
Myrsine retusa Aiton
Nasturtium officinale R. Br.
Nicotiana tabacum L.
Nothoscordum gracile (Aiton) Stearn
Ocotea foetens (Aiton) Baill.
Oenothera glazoviana Micheli
Oenothera longiflora L.
Oenothera rosea L'Hér. ex Aiton
Oenothera stricta Ledeb. ex Link
Opuntia dillenii (Ker-Gawl.) Haw.
Origanum vulgare L. ssp. *virens* (Hoffm. & Link) Ietsw.
Ornithopus perpusillus L.
Ornithopus pinnatus (Mill.) Druce
Ornithopus sativus Brot.
Orobanche crenata Forssk.
Orobanche minor Sm.
Oxalis articulata Savigny
Oxalis corniculata L.
Oxalis latifolia Kunth
Oxalis pes-caprae L.
Oxalis purpurea L.
Panicum miliaceum L.
Papaver dubium L.
Papaver pinnatifidum Moris
Papaver rhoeas L.
Papaver somniferum L. ssp. *somniferum*
Parentucellia viscosa (L.) Caruel
Pericallis malviflora (L' Hér.) B. Nord. ssp. *malviflora*
Parietaria debilis G. Forst.
Parietaria judaica L.
Paspalum dilatatum Poir.
Paspalum distichum L.
Paspalum vaginatum Sw.
Passiflora caerulea L.
Pennisetum villosum R. Br. ex Fresen.
Persea indica (L.) C. K. Sprengel
Persicaria capitata (Buch. Ham. Ex D. Don) H. Gross
Persicaria hydropiperoides Small
Persicaria lapathifolia (L.) Delarbre ssp. *lapathifolia*
Persicaria maculosa Gray
Persicaria salicifolia (Brouss. Ex Willd.) Assenov
Petasites fragrans (Vill.) C. Presl
Petroselinum crispum (Mill.) Hill
Phalaris arundinacea L. ssp. *arundinacea*
Phormium tenax J. R. Forst. & G. Forst.
Phyllostachys bambusoides Siebold & Zucc.
Physalis peruviana L.
Phytolacca americana L.
Picconia azorica (Tutin) Knobl.
Pittosporum tobira (Thunb.) Aiton
Pittosporum undulatum Vent.
Plantago coronopus L.
Plantago lanceolata L.
Plantago major L.
Platanthera azorica Schlecht.
Platanthera micrantha (Hochst. ex Seub.) Schlecht.
Poa annua L.
Poa trivialis L.
Polycarpon tetraphyllum (L.) L.
Polygonum aviculare L.
Polypogon maritimus Willd.
Polypogon monspeliensis (L.) Desf.
Polypogon viridis (Gouan) Breistr.
Portulaca oleracea L. ssp. *oleraceae*
Potamogeton polygonifolius Pourr.
Potamogeton pusillus L.
Potentilla anglica Laich.
Potentilla erecta (L.) Räusch.
Prunella vulgaris L.
Prunus lusitanica L. ssp. *azorica* (Mouillef.) Franco
Pseudognaphalium luteo-album (L.) Hilliard & Burtt
Psidium littorale Raddi
Pycreus flavescens (L.) Rchb.
Ranunculus cortusifolius Willd.
Ranunculus flammula L. ssp. *flammula*
Ranunculus muricatus L.
Ranunculus parviflorus L.
Ranunculus repens L.
Ranunculus trilobus Desf.
Raphanus raphanistrum L. ssp. *landra* (Moretti ex DC.) Bonnier & Layens
Raphanus raphanistrum L. ssp. *raphanistrum*
Reseda luteola L.
Rhaphiolepis umbellata Makino.
Rhus coriaria L.
Ricinus communis L.
Ridolfia segetum (L.) Moris
Rubia agostinhoi Dans. & P. Silva
Rubus hochstetterorum Seub.
Rubus ulmifolius Schott
Rumex acetosella L. ssp. *pyrenaicus* (Pourret ex Lapeyr.) Akeroyd.
Rumex australis (Willk.) A. Fern.
Rumex conglomeratus Murray
Rumex crispus L.
Rumex obtusifolius L. ssp. *obtusifolius*
Rumex pulcher L. ssp. *pulcher*
Ruscus aculeatus L.

Sagina apetala Ard.
Sagina maritima G. Don fil.
Sagina procumbens L.
Salpichroa origanifolia (Lam.) Baill.
Sambucus nigra L.
Samolus valerandi L.
Scabiosa atropurpurea L.
Scabiosa nitens Roem. & Schult.
Scrophularia auriculata L.
Sedum rupestre L.
Selaginella kraussiana (Kunze) A. Braun
Senecio cineraria DC. ssp. *cineraria*
Senecio mikanioides Otto ex Walp.
Senecio vulgaris L.
Setaria parviflora (Poir.) Kerguélen
Setaria pumila (Poir.) Roem. & Schult.
Setaria verticillata (L.) P. Beauv.
Sherardia arvensis L.
Sibthorpia europaea L.
Sida rhombifolia L.
Silene gallica L.
Silene uniflora Roth ssp. *uniflora*
Silene vulgaris (Moench) Garcke ssp. *vulgaris*
Sisymbrium officinale (L.) Scop.
Solanum luteum Mill.
Solanum mauritianum Scop.
Solanum nigrum L.
Solanum pseudocapsicum L.
Soleirolia soleirolii (Req.) Dandy
Solidago sempervirens L.
Sonchus asper (L.) Hill ssp. *asper*
Sonchus oleraceus L.
Sonchus tenerrimus L.
Sorghum halepense (L.) Pers.
Spartina versicolor Fabre
Spartium junceum L.
Spergula arvensis L.
Spergularia azorica (Kindb.) Lebel
Spergularia bocconei (Scheele) Asch. & Graebn.
Sporobolus africanus (Poir.) Robyns & Tournay
Stachys arvensis (L.) L.
Stellaria media (L.) Vill. ssp. *media*
Stenotaphrum secundatum (Walter) Kuntze
Tamarix africana Poir.
Tanacetum parthenium (L.) Sch.-Bip.
Taxus baccata L.
Tecomaria capensis (Thunb.) Spach
Teline monspessulana (L.) K. Koch
Tetragonia tetragonioides (Pall.) Kuntze
Thymus caespititius Brot.
Tolpis azorica (Nutt.) P. Silva
Tolpis barbata (L.) P. Gaertn.
Tolpis succulenta (Dryand.) Lowe
Torilis arvensis (Huds.) Link ssp. *arvensis*
Trachelium caeruleum L.
Tradescantia fluminensis Vell.
Trifolium arvense L.
Trifolium campestre Schreb.
Trifolium dubium Sibth.
Trifolium glomeratum L.
Trifolium incarnatum L.
Trifolium ligusticum Balb. ex Loisel.
Trifolium pratense L.
Trifolium repens L.
Trifolium resupinatum L.
Tropaeolum majus L.
Ulex minor Roth
Umbilicus horizontalis (Guss.) DC.
Umbilicus rupestris (Salisb.) Dandy
Urtica membranacea Poir.
Vaccinium cylindraceum Sm.
Verbascum virgatum Stokes
Verbena bonariensis L.
Verbena officinalis L.
Veronica anagallis-aquatica L.
Veronica arvensis L.
Veronica catenata Pennell
Veronica dabneyi Hochst.
Veronica officinalis L.
Veronica peregrina L.
Veronica persica Poir.
Veronica serpyllifolia L.
Viburnum treleasei Gandoger
Vicia benghalensis L.
Vicia faba L.
Vicia hirsuta (L.) Gray
Vicia sativa L. ssp. *nigra* (L.) Ehrh.
Vicia tenuissima (M. Bieb.) Schinz & Thell.
Vinca difformis Pourr.
Vinca major L.
Viola odorata L.
Viola palustris L. ssp. *juresii* (Link ex K. Wein) Cout.
Vulpia bromoides (L.) Gray
Vulpia muralis (Kunth) Nees
Vulpia myuros (L.) C. C. Gmel.
Xanthium strumarium L. ssp. *Italicum* (Moretti) D. Löve
Zantedeschia aethiopica (L.) Spreng.

19.3.4. Kingdom Animalia – 1275 species

Porifera – 14 species

Axinyssa aurantiaca (Schmidt, 1864)
Clathria (Microciona) strepsitoxa (Carter & Hope, 1889)
Clathrina clathrus (Schmidt, 1864)
Ciocalypta penicillus Bowerbank, 1862
Eurete sp. Semper, 1868
Haliclona cf. *cinerea* de Laubenfels, 1932
Hamacantha (Hamacantha) schmidti (Carter, 1882)
Hamigera hamigera (Schmidt, 1862) (Boury-Esnault 1976)
Leiodermatium pfeifferae (Carter, 1876)
Stelletta dendyi (Sollas, 1888)
Sycon ciliatum (Fabricius, 1780)
Sycon sp. Risso, 1826
Tedania sp. Gray, 1867
Terpios fugax Duchassaing & Michelotti, 1864

Cnidaria – 26 species

Actinia equina (Linnaeus, 1758)
Aglaophenia sp. Lamouroux, 1812
Aiptasia mutabilis (Gravenhorst, 1831)
Alcyonium glomeratum (Hassal, 1843)
Alicia mirabilis Johnson, 1861
Anemonia sargassiensis Hargitt, 1908
Antipathes wollastoni Gray, 1857
Arachnanthus nocturnus den Hartog, 1977
Calliactis parasitica (Couch, 1838)
Octocorallia sp. Haeckel, 1866
Parazoanthus sp. Haddon & Shackleton, 1891
Pelagia noctiluca (Forsskål, 1775)
Pennatula aculeata Danielssen, 1860
Physalia physalis (Linnaeus, 1758)
Caryophyllia inornata (Duncan, 1878)
Caryophyllia smithii Stokes & Broderip, 1828
Corynactis viridis Allman, 1846
Ctenocella flagellum (Thomson & Russell, 1910)
Diphasia sp. Agassiz, 1862
Eudendrium sp. Ehrenberg, 1834
Madracis pharensis (Heller, 1868)
Nemertesia ramosa (Lamarck, 1816)
Obelia sp. Péron & Lesueur, 1810
Physophora hydrostatica Forskål, 1775
Sertularella polyzonias (Linnaeus, 1758)
Sertularella sp. Gray, 1848
Telmatactis forskalii (Ehrenberg, 1834)

Ctenophora – 3 species

Beroe cucumis Fabricius, 1780
Beroe forskalii Milne Edwards, 1841
Bolinopsis infundibulum (Müller, 1776)

Bryozoa - 6 species

Bugula neritina (Linnaeus, 1758)
Bugula cf. *turbinata* Alder, 1857
Reptadeonella violacea (Johnston, 1847)
Scrupocellaria scrupea Busk, 1852
Sertella beaniana (King, 1846)
Smittina cervicornis (Pallas, 1766)

Mollusca – 153 species

Abraliopsis pfefferi Joubin, 1896
Acanthinula azorica Pilsbry, 1926
Acanthochitona fascicularis (Linnaeus, 1767)
Acmaea virginea (Müller O.F., 1776)
Aequipecten opercularis (Linnaeus, 1758)
Alvania angioyi van Aartsen, 1982
Alvania cancellata (da Costa, 1778)
Alvania mediolittoralis Gofas, 1989
Alvania poucheti Dautzenberg, 1889
Ammonicera fischeriana (Monterosato, 1869)
Ammonicera rota (Forbes & Hanley, 1850)
Aplysia depilans Gmelin, 1791
Aplysia fasciata Poiret, 1789
Aplysia punctata (Cuvier, 1803)

Arca tetragona Poli, 1795
Architeuthis dux Steenstrup, 1856
Argonauta argo Linnaeus, 1758
Arion intermedius Normand, 1852
Arion lusitanicus Mabille, 1868
Auriculinella bidentata (Montagu, 1808)
Balea nitida Mousson, 1858
Bathymodiolus sp. Kenk & Wilson, 1985
Berthellina edwardsi (Vayssière, 1896)
Botryphallus ovummuscae (Gofas, 1990)
Caecum sp. Fleming, 1813
Calliostoma zizyphinum (Linnaeus, 1758)
Callista chione (Linnaeus, 1758)
Cardita calyculata (Linné, 1758)
Carychium ibazoricum Bank & Gittenberger, 1985
Carychium minimum Müller, 1774
Cerithiopsis cf. *minima* (Brusina, 1865)
Cerithiopsis jeffreysi Watson, 1885
Charonia lampas (Linnaeus, 1758)
Cheirodonta pallescens (Jeffreys, 1867)
Chromodoris britoi Ortea & Perez, 1983
Chromodoris krohni (Vérany, 1846)
Chromodoris purpurea (Risso in Guérin, 1831)
Chthamalus stellatus (Poli, 1795)
Cima sp. Chaster, 1898
Cingula trifasciata (Adams J., 1800)
Cochlicella barbara (Linnaeus, 1758)
Cochlicopa lubrica (Müller, 1774)
Cochlicopa lubricella (Porro, 1838)
Columbella adansoni Menke, 1853
Columella aspera Waldén, 1966
Crassadoma pusio (Linné, 1758)
Crisilla postrema (Gofas, 1990)
Dendrodoris herytra Valdés & Ortea in Valdés, Ortea, Avila & Ballesteros, 1996
Deroceras caruanae (Pollonera, 1891)
Deroceras leave (Müller, 1774)
Deroceras reticulatum (Muller, 1774)
Discus rotundatus (Müller, 1774)
Doris ocelligera (Bergh, 1881)
Elysia ornata (Swainson, 1840)
Euconulus fulvus (Müller, 1774)
Flabellina pedata (Montagu, 1815)
Fossarus ambiguus (Linnaeus, 1758)
Geitodoris planata (Alder & Hancock, 1846)
Greilada elegans Bergh, 1894
Haliotis coccinea Reeve, 1846
Haliotis tuberculata Linnaeus, 1758
Haliphron atlanticus Steenstrup, 1861
Helix aspersa Müller, 1774
Heteranomia squamula (Linnaeus, 1758)
Hexaplex trunculus (Linné, 1758)
Histioteuthis bonnellii (de Férussac, 1835)
Hydrocena gutta Shuttleworth, 1852
Hypselodoris picta azorica Ortea, Valdés & García-Gómez, 1996
Hypselodoris tricolor (Cantraine, 1835)
Jujubinus pseudogravinae Nordsieck, 1973
Lasaea adansoni Gmelin, 1791
Lauria anconostoma (Lowe, 1831)
Lauria fasciolata (Morelet, 1860)
Lehmannia valentiana (Ferussac, 1823)
Leiostyla fuscidula (Morelet, 1860)
Leptaxis azorica (Albers, 1852)
Limacus flavus (Linnaeus, 1758)
Limaria hians (Gmelin, 1791)
Limax maximus Linnaeus, 1758
Liocranchia reinhardtii (Steenstrup, 1856)
Litiopa melanostoma (Rang, 1829)
Littorina saxatilis (Olivi, 1792)
Littorina striata King & Broderip, 1832
Loligo forbesi Steenstrup, 1856
Loligo sp. Lamarck, 1798
Lunatia sp. Gray, 1847
Manzonia unifasciata Dautzenberg, 1889
Marshallora adversa (Montagu, 1803)
Melarhaphe neritoides (Linnaeus, 1758)
Milax gagates (Draparnaud, 1801)
Mitra cornea (Lamarck, 1811)
Mitra nigra (Gmelin, 1791)
Moreletina horripila (Morelet & Drouët, 1857)
Myosotella myosotis (Draparnaud, 1801)
Napaeus delibutus (Morelet & Drouët, 1857)
Napaeus forbesianus (Morelet & Drouët,1857)
Napaeus vulgaris (Morelet & Drouët, 1857)
Nassarius incrassatus (Ström, 1768)
Neolepton cancellatum (Salas & Gofas, 1998)
Nesovitrea hammonis (Ström, 1765)
Octopus macropus Risso, 1826
Octopus vulgaris Cuvier, 1797
Ocythoe tuberculata Rafinesque, 1814
Odostomella doliolum (Philippi, 1844)
Odostomia sp. Fleming, 1813
Oestophora barbula (Rossmässler, 1838)
Ommastrephes bartramii (Lesueur, 1821)
Omosudis lowii Günther, 1887
Onchidella celtica (Cuvier, 1817)
Ovatella vulcani (Morelet, 1860)
Oxychilus (Drouetia) *atlanticus* (Morelet. & Drouët, 1857)
Oxychilus cellarius (Müller, 1774)
Oxychilus draparnaudi (Beck, 1837)
Paludinella littorina (delle Chiaje, 1828)

Parvicardium ovale (Sowerby G.B. II, 1840)
Parvioris sp. Warén, 1981
Patella ulyssiponensis aspera (Roding, 1858)
Patella candei d'Orbigny, 1840
Pedipes pedipes (Bruguière, 1789)
Peringiella ovummuscae Gofas, 1990
Pinna rudis Linnaeus, 1758
Plagiocardium papillosum (Poli, 1795)
Pisinna glabrata (Von Mühlfeldt, 1824)
Platydoris argo (Linnaeus, 1767)
Pleurobranchus testudinarius Cantraine, 1835
Plutonia finitima (Morelet, 1860)
Pseudomelampus exiguus (Lowe, 1832)
Raphitoma cf. *linearis* (Montagu, 1803)
Rissoa guernei Dautzenberg, 1889
*Rissoella s*p.Gray, 1874
Rumina decollata (Linnaeus, 1758)
Runcina Forbes & Hanley, 1851
Setia sp. H. & A. Adams, 1852
Setia subvaricosa Gofas, 1990
Sinezona cingulata (Costa O.G., 1861)
Skeneopsis planorbis (Fabricius O., 1780)
Spermodea monas (Morelet, 1860)
Stramonita haemastoma (Linnaeus, 1766)
Tambja ceutae Garcia-Gomez & Ortea, 1988
Taningia danae Joubin, 1931
Testacella maugei Férussac, 1819
Theba pisana (Müller, 1774)
Toltecia pusilla (Lowe, 1831)
Tremoctopus violaceus Delle Chiaje, 1830
Tylodina perversa (Gmelin, 1791)
Tricolia pullus azorica (Dautzenberg, 1889)
Vallonia costata (Müller, 1774)
Vallonia pulchella (Müller, 1774)
Vermetus triquetrus Bivona Ant., 1832
Vertigo pygmaea (Draparnaud, 1801)
Vitrea contracta (Westerlund, 1871)
Vitreolina sp. Monterosato, 1884
Williamia gussonii (Costa O.G., 1829)
Sipuncula - 1 espécie
Golfingia margaritacea (Sars, 1851)
Annelida- 15 espécies
Ditrupa arietina (OF Müller, 1776)
Eulalia viridis (Johnston, 1829)
Eupolymnia nebulosa (Montagu, 1818)
Hermodice carunculata (Pallas, 1766)
Lepidonotus clava (Montagu, 1808)
Lysidice ninetta Audouin & Milne-Edwards, 1833
Megalomma vesiculosum (Montagu, 1815)
Myxicola infundibulum (Montagu, 1808)
Phyllodoce laminosa Savigny in Lamarck, 1818
Polycirrus sp. Grube, 1850
Pomatostegus polytrema (Philippi, 1844)
Pontogenia chrysocoma (Baird, 1865)
Protodrilus Czerniavsky, 1881
Sabella spallanzanii (Gmelin, 1791)
Thelepus cincinnatus (Fabricius, 1780)

Arthropoda - 736 species

Acalypta parvula (Fallén, 1807)
Acarus siro (Linnaeus, 1758)
Achaearanea acoreensis (Berland, 1932)
Achaearanea simulans (Thorell, 1875)
Achaearanea tepidariorum (C.L. Koch, 1841)
Acherontia atropos (Linnaeus, 1758)
Achipteria coleoptrata coleoptrata (Linnaeus, 1758)
Acorigone acoreensis (Wunderlich, 1992)
Acrogalumna longipluma longipluma (Berlese, 1904)
Acrotrichis fascicularis (Herbst, 1793)
Acrotrichis matthewsi Wollaston, 1864
Acrotrichis sanctaehelenae Johnson, 1972
Acrotrichis sericans (Heer, 1841)
Acupalpus brunnipes (Sturm, 1825)
Acupalpus dubius Schilsky, 1888
Acyrthosiphon pisum (Harris, 1776)
Adalia decempunctata (Linnaeus, 1758)
Adia cinerella (Fallén, 1825)
Aepus gracilicornis gracilicornis Wollaston, 1860
Agabus bipustulatus (Linnaeus, 1767)
Agabus godmani Crotch, 1867
Agonum marginatum (Linnaeus, 1758)
Agrius convolvuli (Linnaeus, 1758)
Agrotis ipsilon (Hufnagel, 1766)
Agrotis segetum (Denis & Schiffermüller, 1775)
Agyneta decora (O. P.-Cambridge, 1871)
Agyneta depigmentata Wunderlich, 2008
Ahasverus advena (Waltl, 1832)
Aleochara albopila (Mulsant & Rey, 1852)
Aleochara bipustulata (Linnaeus, 1761)
Alestrus dolosus (Crotch, 1867)
Allopauropus ramosus Scheller, 1962
Aloconota insecta (Thomson, 1856)
Aloconota sulcifrons (Stephens, 1832)
Amara aenea (De Geer, 1774)
Amischa analis (Gravenhorst, 1802)

Amphorophora rubi (Kaltenbach, 1843) sensu latiore
Anaspis proteus Wollaston, 1854
Anax imperator Leach, 1815
Anisodactylus binotatus (Fabricius, 1787)
Anisolabis maritima (Bonelli, 1832)
Anobium punctatum (De Geer, 1774)
Anoscopus albifrons (Linnaeus, 1758)
Anotylus complanatus (Erichson, 1839)
Anotylus nitidifrons (Wollaston, 1871)
Anotylus nitidulus (Gravenhorst, 1802)
Anthrenus verbasci (Linnaeus, 1767)
Aphaniosoma azoricum Frey, 1958
Aphis affinis Del Guercio, 1911
Aphrodes hamiltoni Quartau & Borges, 2003
Aphrosylus argyreatus Frey, 1945
Aphrosylus calcarator Frey, 1945
Apis mellifera Linnaeus, 1758
Aprostocetus azoricus Graham, 1987
Aptinothrips rufus Haliday, 1836
Argyresthia atlanticella Rebel, 1940
Argyresthia minusculella Rebel, 1940
Argyrodes nasicus (Simon, 1873)
Aristaeopsis edwardsiana (Johnson, 1867)
Ascotis fortunata azorica Pinker, 1971
Aspidapion radiolus chalybeipenne (Wollaston, 1854)
Asteia amoena Meigen, 1830
Astenus lyonessius (Joy, 1908)
Atheta acuicollis (Sharp, 1876)
Atheta amicula (Stephens, 1832)
Atheta aptera Israelson, 1985
Atheta atramentaria (Gyllenhal, 1810)
Atheta coriaria (Kraatz, 1856)
Atheta dilutipennis Motschulsky, 1858
Atheta fungi (Gravenhorst, 1806)
Atheta luridipennis (Mannerheim, 1830)
Atheta nigra (Kraatz, 1856)
Atheta palustris (Kiesenwetter, 1844)
Atheta pseudolaticollis Erber & Hinterseher, 1992
Atheta sordida (Marsham, 1802)
Atissa pygmaea (Haliday, 1833)
Atlantocis gillerforsi Israelson, 1986
Atlantopsocus adustus (Hagen, 1865)
Attalus lusitanicus Erichson, 1840
Autographa gamma (Linnaeus, 1758)
Azorastia minutissima Frey, 1945
Bactra lancealana (Hübner, 1799)
Bathynectes sp. Stimpson, 1871
Bdella Latreille, 1795
Bisnius sordidus (Gravenhorst, 1802)
Blaniulus guttulatus (Fabricius, 1798)
Blaps lethifera Marsham, 1802
Brachycaudus persicae (Passerini, 1860)
Brachydesmus superus Latzel, 1884
Brachyiulus pusillus (Leach, 1814)
Bradysia amoena (Winnertz, 1867)
Bradysia brunnipes (Meigen, 1804)
Bradysia truncorum (Frey, 1945)
Bradysiopsis vittata (Meigen, 1830)
Bruchus pisorum (Linnaeus, 1758)
Buchananiella continua (White, 1880)
Cadra cautella (Walker, 1863)
Cafius xantholoma (Gravenhorst, 1806)
Calacalles droueti (Crotch, 1867)
Calacalles subcarinatus (Israelson, 1984)
Calamosternus granarius (Linnaeus, 1767)
Calappa granulata (Linnaeus, 1758)
Calcinus tubularis (Linnaeus, 1767)
Calliphora vicina Robineau-Desvoidy, 1830
Calliphora vomitoria (Linnaeus, 1758)
Calosoma olivieri Dejean, 1831
Campachipteria petiti (Travé, 1960)
Campsicnemus curvipes (Fallén, 1823)
Camptocladius stercorarius (De Geer, 1776)
Campyloneura virgula (Herrich-Schaeffer, 1835)
Canace nasica (Haliday, 1839)
Cancer bellianus Johnson, 1861
Cardiocladius freyi Stora in Frey, 1936
Carpelimus bilineatus (Stephens, 1834)
Carpelimus corticinus (Gravenhorst, 1806)
Carpelimus pusillus (Gravenhorst, 1802)
Carpophilus dimidiatus (Fabricius, 1792)
Carpophilus fumatus Boheman, 1851
Carpophilus nepos Murray, 1864
Cartodere nodifer (Westwood, 1839)
Cathormiocerus curvipes (Wollaston, 1854)
Ceratitis capitata (Wiedemann, 1824)
Ceratophysella denticulata (Bagnall, 1941)
Ceratophysella engadinensis Gisin, 1949
Cercyon haemorrhoidalis (Fabricius, 1775)
Cercyon lugubris (Olivier, 1790)
Cercyon nigriceps (Marsham, 1802)
Cerodontha denticornis (Panzer, 1806)
Cerodontha morosa (Meigen, 1830)
Ceroplastes sinensis Del Guercio, 1900
Chaceon affinis (A. Milne-Edwards & Bouvier, 1894)
Chaetocladius melaleucus (Meigen, 1818)
Chamaemyia geniculata (Zetterstedt, 1838)
Chamaemyia polystigma (Meigen, 1830)
Cheiracanthium erraticum (Walckenaer, 1802)
Cheiracanthium floresense Wunderlich n. sp.

Cheiracanthium mildei C.L. Koch, 1864
Cheyletus eruditus Schrank, 1781
Chironomus dorsalis Meigen, 1818
Chironomus riparius Meigen, 1804
Chlorophorus pilosus (Forster, 1771)
Choneiulus palmatus (Nemec, 1895)
Chortoglyphus arcuatus (Troupeau, 1879)
Chromatomyia horticola (Goureau, 1851)
Chrysodeixis chalcites (Esper, 1789)
Chrysolina bankii (Fabricius, 1775)
Chrysoperla agilis Henry, Brooks, Duelli & Johnson, 2003
Chrysoperla lucasina (Lacroix, 1912)
Chrysotus elongatus Parent, 1934
Chrysotus polychaetus Frey, 1945
Chrysotus vulcanicola Frey, 1945
Chrysotus xanthoprasinus Bezzi, 1906
Chthonius ischnocheles (Hermann, 1804)
Chthonius tetrachelatus (Preyssler, 1790)
Chyromya fava (Linnaeus, 1758)
Cilea silphoides (Linnaeus, 1767)
Cinara juniperi (De Geer, 1773)
Cinetorhynchus rigens (Gordon, 1936)
Cixius azofloresi Remane & Asche, 1979
Clibanarius erythropus (Latreille, 1818)
Clinocera azorica Wagner & Stauder, 1991
Clinocera stagnalis (Haliday, 1833)
Clinocera storai Frey, 1945
Clubiona terrestris Westring, 1851
Coboldia fuscipes (Meigen, 1830)
Coccinella undecimpunctata undecimpunctata Linnaeus, 1758
Colias croceus (Fourcroy, 1785)
Conicera sobria Schmitz, 1936
Coproica ferruginata (Stenhammar, 1854)
Copromyza equina Fallén, 1820
Coproporus pulchellus (Erichson, 1839)
Cordalia obscura (Gravenhorst, 1802)
Corixa affinis Leach, 1817
Corticarina fulvipes fulvipes (Comolli, 1837)
Costaconvexa centrostrigaria (Wollaston, 1858)
Cotesia glomerata (Linnaeus, 1758)
Creophilus maxillosus maxillosus (Linnaeus, 1758)
Cryptamorpha desjardinsii (Guérin-Ménev-ille, 1844)
Cryptolestes capensis (Waltl, 1834)
Cryptophagus pilosus Gyllenhal, 1828
Cryptophagus saginatus Sturm, 1845
Cryptophagus schmidti Sturm, 1845
Cryptops hortensis (Donovan, 1810)
Cryptosoma cristatum Brullé, 1837
Ctenocephalides canis (Curtis, 1826)
Ctenocephalides felis felis (Bouché, 1835)
Ctenolepisma longicaudata Escherich, 1905
Ctenoplusia limbirena (Gueneé, 1852)
Culex pipiens Linnaeus, 1758
Culiseta longiareolata (Macquart, 1838)
Cyclophora azorensis (Prout, 1920)
Cylindroiulus latestriatus (Curtis, 1845)
Cylindroiulus propinquus (Porat, 1870)
Cypha pulicaria (Erichson, 1839)
Cyphopterum adcendens (Herrich-Schäffer, 1835)
Dactylosternum abdominale (Fabricius, 1792)
Danaus plexippus (Linnaeus, 1758)
Dardanus calidus (Risso, 1827)
Dasyhelea dufouri (Laboulbène, 1869)
Dasyhelea favoscutellata (Zetterstedt, 1850)
Delia platura (Meigen, 1826)
Dermestes frischi Kugelann, 1792
Desmometopa m-nigrum (Zetterstedt, 1848)
Desoria trispinata (MacGillivray, 1896)
Diadegma chrysostictum (Gmelin, 1790)
Diadegma semiclausum (Hellén, 1949)
Diasemiopsis ramburialis (Duponchel, 1833)
Dicranomyia michaeli (Theowald, 1977)
Dicranomyia vicina (Macquart, 1838)
Dicrocheles phalaenodectes (Treat, 1954)
Dictyna acoreensis (Wunderlich, 1992)
Dicyrtoma fusca (Lubbock, 1873)
Dicyrtomina minuta (O. Fabricius, 1783)
Dicyrtomina saundersi (Lubbock, 1862)
Dilta saxicola (Womersley, 1930)
Diplazon laetatorius (Fabricius, 1781)
Diplonevra funebris (Meigen, 1830)
Discobola freyana (Nielsen, 1961)
Discocerina obscurella (Fallen, 1813)
Dixella laeta (Loew, 1849)
Dohrniphora cornuta (Bigot in de la Sagra, 1856)
Dolichopus signifer Haliday, 1838
Dromia marmorea Forest, 1974
Drosophila busckii Coquillett, 1901
Drosophila funebris (Fabricius, 1787)
Drosophila melanogaster Meigen, 1830
Drosophila repleta Wollaston, 1858
Drosophila subobscura Collin in Gordon, 1936
Dryops luridus (Erichson, 1847)
Dynamene bidentata (Adams, 1800)
Dysaphis crithmi (Buckton, 1886)
Dysdera crocata C.L. Koch, 1838
Ectopsocus briggsi McLachlan, 1899
Elachiptera bimaculata (Loew, 1845)
Elachiptera megaspis (Loew, 1858)

Elachisoma aterrimum (Haliday, 1833)
Elipsocus azoricus Meinander, 1975
Elipsocus brincki Badonnel, 1963
Eluma purpurascens Budde-Lund, 1885
Empicoris brevispinus (Puton, 1889)
Enoplognatha mandibularis (Lucas, 1846)
Ensina azorica Frey, 1945
Entomobrya multifasciata (Tullberg 1871)/E. nivalis (Linnaeus, 1758)
Ephistemus globulus (Paykull, 1798)
Episyrphus balteatus (De Geer, 1776)
Epitrix cucumeris (Harris, 1851)
Epuraea aestiva (Linnaeus, 1758)
Epuraea biguttata (Thunberg, 1784)
Epuraea longula Erichson, 1845
Erigone atra (Blackwall, 1833)
Erigone autumnalis Emerton, 1882
Erigone dentipalpis (Wider, 1834)
Eriphia verrucosa (Forskal, 1775)
Eristalinus aeneus (Scopoli, 1763)
Eristalis arbustorum (Linnaeus, 1758)
Eristalis tenax (Linnaeus, 1758)
Ero flammeola Simon, 1881
Ero furcata (Villers, 1789)
Euborellia annulipes (Lucas, 1847)
Eudasyphora cyanella (Meigen, 1826)
Eudonia interlinealis (Warren, 1905)
Eudonia luteusalis (Hampson, 1907)
Eudonia melanographa (Hampson, 1907)
Eukiefferiella gracei (Edwards, 1929)
Eupeodes corollae (Fabricius, 1794)
Eupteryx azorica Ribaut, 1941
Eupteryx filicum (Newman, 1853)
Eurydice affinis Hansen, 1905
Euryomma peregrinum (Meigen, 1826)
Euscelidius variegatus (Kirschbaum, 1858)
Euxesta freyi Krivosheina & Krivosheina, 1997
Euzetes globulus (Nicolet, 1855)
Falagria concinna Erichson, 1840
Fannia canicularis (Linnaeus, 1761)
Fannia incisurata (Zetterstedt, 1838)
Folsomia candida Willem, 1902
Forficula auricularia Linnaeus, 1758
Fucellia tergina (Zetterstedt, 1845)
Gabrius nigritulus (Gravenhorst, 1802)
Galathea squamifera Leach, 1814
Galathea strigosa (Linnaeus, 1767)
Galathea sp. Fabricius, 1793
Galgula partita Gueneé, 1852
Galleria mellonella (Linnaeus, 1758)
Galumna azoreana Pérez-Íñigo, 1992
Geranomyia unicolor (Haliday, 1833)
Gibbaranea occidentalis Wunderlich, 1989
Gnathocerus cornutus (Fabricius, 1798)
Gnathophyllum elegans (Risso, 1816)
Grapsus adscencionis (Osbeck, 1765)
Grapsus grapsus (Linnaeus, 1758)
Gryllus bimaculatus De Geer, 1773
Gyrinus distinctus Aubé, 1836
Gyrohypnus fracticornis (Müller, 1776)
Halocladius varians (Staeger, 1839)
Halophiloscia couchii (Kinahan, 1858)
Halophiloscia guernei (Dollfus, 1887)
Haplodrassus signifer (C.L. Koch, 1839)
Harpalus distinguendus distinguendus (Duftschmidt, 1812)
Hebecnema fumosa (Meigen, 1826)
Hecamede albicans (Meigen, 1830)
Helicoverpa armigera (Hübner, 1808)
Helina sexmaculata (Preyssler, 1791)
Heliothrips haemorrhoidalis (Bouché, 1833)
Hemerobius azoricus Tjeder, 1948
Hemerobius humulinus Linnaeus, 1758
Hermannia woasi Pérez-Íñigo, 1992
Herbstia condyliata (Fabricius, 1787)
Heteroderes azoricus Tarnier, 1860
Heteromurus major (Moniez, 1889)
Heterota plumbea (Watterhouse, 1858)
Hipparchia azorina occidentalis (Sousa, 1985)
Hippobosca equina Linnaeus, 1758
Hirticomus quadriguttatus (Rossi, 1794)
Homalenotus coriaceus (Simon, 1879)
Homola barbata (Fabricius, 1793)
Hoplothrips corticis (De Geer, 1773)
Hoplothrips ulmi (Fabricius, 1781)
Humerobates pomboi Pérez-Íñigo, 1992
Hyadina agostinhoi Frey, 1945
Hyadina guttata (Fallen, 1813)
Hyale perieri (Lucas, 1849)
Hydrellia griseola (Fallen, 1813)
Hydrellia maura Meigen, 1838
Hydrellia ranunculi Haliday, 1839
Hydrophorus praecox (Lehmann, 1822)
Hydroporus guernei Régimbart, 1891
Hydroptila vectis Curtis, 1834
Hydrotaea dentipes (Fabricius, 1805)
Hylotrupes bajulus (Linnaeus, 1758)
Hypena obsitalis (Hübner, 1813)
Hypera postica (Gyllenhal, 1813)
Hypogastrura manubrialis (Tullberg, 1869)
Hypomedon debilicornis (Wollaston, 1857)
Hypoponera eduardi (Forel, 1894)

Ichneumon sarcitorius Linnaeus, 1758
Idotea granulosa Rathke, 1843
Idotea neglecta G.O. Sars, 1897
Ischnura hastata (Say, 1839)
Ischnura pumilio (Charpentier, 1825)
Isotomiella minor (Schäffer, 1896)
Isotomurus palustris (Müller, 1776)
Jaera guernei Dollfus, 1889
Jaera insulana Veuille, 1977
Jaera nordmanni Rathke, 1837
Jaera vulcana Veuille, 1982
Javesella azorica Remane, 1975
Kalcapion semivittatum semivittatum (Gyllenhal, 1833)
Kleidocerys ericae (Horváth, 1908)
Labarrus lividus (Olivier, 1789)
Laemostenus complanatus (Dejean, 1828)
Lampides boeticus (Linnaeus, 1767)
Laparocerus azoricus Drouet, 1859
Lasaeola oceanica Simon, 1833
Lasius grandis Forel, 1909
Lathys dentichelis (Simon, 1883)
Latridius minutus (Linnaeus, 1767)
Leia arsona Hutson, 1978
Leiobunum blackwalli Meade, 1861
Lepas anatifera Linnaeus, 1758
Lepidocyrtus curvicollis Bourlet, 1839
Lepidoglyphus destructor (Schrank, 1781)
Lepthyphantes acoreensis Wunderlich, 1992
Leptocera caenosa (Rondani, 1880)
Leptocera nigra Olivier, 1813
Leptometopa latipes (Meigen, 1830)
Liacarus mucronatus Willmann, 1939
Ligur ensiferus (Risso, 1816)
Liocarcinus marmoreus (Leach, 1814)
Ligia italica Fabricius, 1798
Limnephilus atlanticus Nybom, 1948
Limnophyes minimus (Meigen, 1818)
Linepithema humile (Mayer, 1868)
Liorhyssus hyalinus (Fabricius, 1794)
Liparthrum curtum Wollaston, 1854
Lipothrix lubbocki (Tullberg, 1872)
Liriomyza subartemisicola Frey, 1945
Liriomyza umbilici Hering, 1927
Lispe nana Macquart, 1835
Litargus pilosus Wollaston, 1857
Lithobius lusitanus lusitanus Verhoeff, 1925
Lithobius pilicornis pilicornis Newport, 1844
Lithocharis nigriceps (Kraatz, 1859)
Locusta migratoria (Linnaeus, 1758)
Lonchoptera bifurcata (Fallén, 1810)
Longitarsus kutscherae (Rye, 1872)
Lordiphosa andalusiaca (Strobl, 1906)
Lordiphosa fenestrarum (Fallén, 1823)
Loricula elegantula (Bärensprung, 1858)
Lotophila atra (Meigen, 1830)
Lucilia sericata (Meigen, 1826)
Lycoriella castanescens (Lengersdorf, 1940)
Lycosoides coarctata (Dufour, 1831)
Lyctocoris campestris (Fabricius, 1794)
Lysibia nanus (Gravenhorst, 1829)
Macaroeris cata (Blackwall, 1867)
Macroglossum stellatarum (Linnaeus, 1758)
Macropelopia nebulosa (Meigen, 1804)
Macrosiphoniella tanacetaria bonariensis E.E. Blanchard, 1922
Macrosteles sexnotatus (Fallén, 1806)
Maderentulus maderensis (Condé, 1957)
Maja brachydactyla Balss, 1922
Malacomyia sciomyzina (Haliday, 1833)
Mangora acalypha (Walckenaer, 1802)
Mangora acalypha (Walckenaer, 1802)
Medetera truncorum Meigen, 1824
Megabalanus azoricus (Pilsbry, 1916)
Megamelodes quadrimaculatus (Signoret, 1865)
Megaselia ardua Schmitz, 1940
Megaselia basispinata (Lundbeck, 1920)
Megaselia marina Schmitz, 1937
Megaselia nigra (Meigen, 1830)
Megaselia rufpes (Meigen, 1804)
Meioneta fuscipalpis (C.L. Koch, 1836)
Melanaphis donacis (Passerini, 1862)
Melanotus dichrous dichrous Erichson, 1821
Melanozetes azoricus floresianus Pérez-íñigo, 1992
Meligethes aeneus (Fabricius, 1775)
Meliscaeva auricollis (Meigen, 1822)
Melita palmata (Montagu, 1804)
Meoneura obscurella (Fallén, 1823)
Mesapamea storai (Rebel, 1940)
Metellina merianae (Scopoli, 1763)
Meteorus communis (Cresson, 1872)
Metopina heselhausi Schmitz, 1914
Metriocnemus fuscipes (Meigen, 1818)
Micropsectra junci (Meigen, 1818)
Microvelia gracillima Reuter, 1882
Micrurapteryx bistrigella (Rebel, 1940)
Miktoniscus chavesi (Dollfus, 1889)
Minicia floresensis Wunderlich, 1992
Minilimosina fungicola (Haliday, 1836)
Mniophilosoma obscurum Gillerfors, 1986
Monalocoris filicis (Linnaeus, 1758)
Monomorium carbonarium (F. Smith, 1858)

Monopis crocicapitella (Clemens, 1859)
Monotoma picipes Herbst, 1793
Monotoma spinicollis Aubé, 1837
Muellerianella brevipennis (Boheman, 1847)
Musca domestica calleva Walker, 1849
Muscina stabulans (Fallén, 1817)
Myathropa forea (Linnaeus, 1758)
Mycetaea subterranea (Fabricius, 1801)
Mythimna unipuncta (Haworth, 1809)
Myzus cerasi (Fabricius, 1775)
Nabis capsiformis Germar, 1838
Nabis pseudoferus ibericus Remane, 1962
Napomyza lateralis (Fallén, 1823)
Naupactus leucoloma Boheman, 1840
Nausibius clavicornis (Kugelann, 1794)
Neobisium maroccanum Beier, 1930
Neomariania incertella Rebel, 1940
Neomariania oecophorella Rebel, 1940
Neomyzus circumflexus (Buckton, 1876)
Neon acoreensis Wunderlich n. sp
? *Neoscona crucifera* (Lucas, 1839)
Nephanes titan (Newman, 1834)
Nephus helgae Fürsch, 1965
Nezara viridula (Linnaeus, 1758)
Niditinea fuscella (Linnaeus, 1758)
Nigma puella (Simon, 1870)
Nitidula carnaria (Schaller, 1783
Noctua atlantica (Warren, 1905)
Noctua carvalhoi (Pinker, 1983)
Noctua pronuba (Linnaeus, 1758)
Nomophila noctuella (Denis & Schiffermüller, 1775)
Nosopsyllus fasciatus (Bosc d'Antic, 1800)
Nosopsyllus londinensis londinensis (Roth-schild, 1903)
Nothrus palustris azorensis Pérez-Íñigo, 1992
Nysius atlantidum Horváth, 1990
Nysius ericae ericae (Schilling, 1829)
Ochthebius frey D`Orchymont, 1940
Ocydromus derelictus (Alluaud, 1926)
Ocydromus schmidti mequignoni (Colas, 1939)
Ocypus aethiops (Waltl, 1835)
Ocypus olens (Müller, 1764)
Ocys harpaloides (Audinet-Serville, 1821)
Oecobius similis Kulczynski, 1909
Oedothorax fuscus (Blackwall, 1834)
Oinophila v-fava (Haworth, 1828)
Oligota parva Kraatz, 1862
Oligota pusillima (Gravenhorst, 1806)
Ommatoiulus moreletii (Lucas, 1860)
Omonadus floralis (Linnaeus, 1758)
Omosita colon (Linnaeus, 1758)
Oniscus asellus Linnaeus, 1758
Onthophagus taurus (Schreber, 1759)
Onychiurus ambulans (Nicolet, 1847)
Onychiurus insubrarius Gisin, 1952
Oonops domesticus De Dalmas, 1916
Opacifrons coxata (Stenhammar, 1855)
Opalimosina mirabilis (Collin, 1902)
Ophonus ardosiacus (Lutshnik, 1922)
Opsius stactogalus Fieber, 1866
Orchestia chevreuxi De Guerne, 1887
Orchestia gammarellus (Pallas, 1766)
Orchestia platensis Kroyer, 1845
Orchisia costata (Meigen, 1826)
Oribotritia berlesei (Michael, 1898)
Orius laevigatus laevigatus (Fieber, 1860)
Orthochaetes insignis (Aubé, 1863)
Orthonama obstipata (Fabricius, 1794)
Oscinella frit (Linnaeus, 1758)
Otiorhynchus cribricollis Gyllenhal, 1834
Otiorhynchus rugosostriatus (Goeze, 1777)
Otiorhynchus sulcatus (Fabricius, 1775)
Oxidus gracilis (C.L. Koch, 1847)
Oxyethira falcata Morton, 1893
Oxytelus sculptus Gravenhorst, 1806
Pachygrapsus marmoratus (Fabricius, 1787)
Pachygrapsus maurus (Lucas, 1846)
Pagurus cuanensis Bell, 1845
Palaemon elegans Rathke, 1837
Palaemon serratus (Pennant, 1777)
Palinurus elephas (Fabricius, 1787)
Palliduphantes schmitzi (Kulczynski, 1899)
Palpita vitrealis (Rossi, 1794)
Pantomorus cervinus (Boheman, 1849)
Parachipetria floresiana (Pérez-Íñigo, 1992)
Parametriocnemus stylatus (Kieffer, 1924)
Paranchus albipes (Fabricius, 1796)
Paratachys micros (Fischer von Waldheim, 1828)
Pardosa acoreensis Simon, 1883
Paromola cuvieri (Risso, 1816)
Parydra coarctata (Fallen, 1813)
Pecten maximus (Linnaeus, 1758)
Pentatrichopus fragaefolii (T.D.A. Cockerell, 1901)
Peridroma saucia (Hübner, 1808)
Periplaneta americana (Linnaeus, 1758)
Phaonia rufventris (Scopoli, 1763)
Phasia pusilla Meigen, 1824
Philonthus longicornis Stephens, 1832
Philonthus rectangulus Sharp, 1874
Philygria cedercreutzi Frey, 1945
Phloeonomus punctipennis Thomson, 1867
Phloeonomus pusillus (Gravenhorst, 1806)

Phloeopora angustiformis Baudi, 1869
Phloeopora corticalis (Gravenhorst, 1802)
Phloeostiba azorica (Fauvel, 1900)
Phlogophora interrupta (Warren, 1905)
Phlogophora meticulosa (Linnaeus, 1758)
Pholcus phalangioides (Fuesslin, 1755)
Phthiracarus piger (Scopoli, 1763)
Phthitia plumosula (Rondani, 1880)
Phycitodes albatella pseudonimbella (Bentinck, 1937)
Phyllocnistis citrella Stainton, 1856
Phytomyza obscura Hendel, 1920
Phytomyza plantaginis Robineau-Desvoidy, 1851
Pieris brassicae azorensis Rebel, 1917
Pimpla rufpes (Miller, 1759)
Pinalitus oromii J. Ribes, 1992
Pisaura acoreensis Wunderlich, 1992
Placonotus donacioides (Wollaston, 1854)
Placonotus testaceus (Fabricius, 1787)
Platycheirus albimanus (Fabricius, 1781)
Platystethus nitens (Sahlberg, 1832)
Plesionika edwardsii (Brandt, 1851)
Plesionika narval (Fabricius, 1787)
Pleurophorus caesus (Creutzer, 1796)
Plodia interpunctella (Hübner, 1813)
Ploiaria chilensis (Philippi, 1862)
Ploiaria domestica Scopoli, 1786
Plutella xylostella (Linnaeus, 1758)
Pollenia rudis (Fabricius, 1794)
Polydesmus coriaceus Porat, 1871
Polymerus cognatus (Fieber, 1858)
Porcellio laevissimus Dollfus, 1898
Porcellionides pruinosus (Brandt, 1833
Porcellionides sexfasciatus (C.L. Koch, 1847)
Portunus hastatus (Linnaeus, 1767)
Praeacedes atomosella (Walker, 1863)
Prinerigone vagans (Audouin, 1826)
Prochyliza nigrimana (Meigen, 1826)
Proctostephanus madeirensis Gama, 1959
Propolydesmus laevidentatus (Loksa, 1967)
Protapanteles militaris (Walsh, 1861)
Protaphis terricola (Rondani, 1847)
Proteinus atomarius Erichson, 1840
Proteroiulus fuscus (Am Stein, 1857)
Psectrocladius sordidellus (Zetterstedt, 1838)
Pseudacaudella rubida (Börner, 1939)
Pseudechinosoma nodosum Hustache, 1936
Pseudeuophrys vafra (Blackwall, 1867)
Pseudisotoma sensibilis (Tullberg, 1876)
Pseudolycoriella campanulata (Frey, 1945)
Pseudoophonus rufipes (De Geer, 1774)
Pseudophloeophagus aenopiceus (Boheman, 1845)
Pseudophloeophagus tenax Wollaston, 1854
Pseudoplectus perplexus (Jacquelin du Val, 1854)
Psilothrix viridicoerulea (Geoffroy, 1785)
Psychoda cinerea Banks, 1894
Psylliodes chrysocephalus (Linnaeus, 1758)
Psylliodes marcidus (Illiger, 1807)
Ptenidium pusillum (Gyllenhal, 1808)
Ptilinus cylindripennis Wollaston, 1854
Pullimosina heteroneura (Haliday, 1836)
Pullimosina vulgesta Rohácek, 2000
Pyralis farinalis Linnaeus, 1758
Quedius fuliginosus (Gravenhorst, 1802)
Rachispoda atrolimosa (Frey, 1945)
Remus pruinosus (Erichson, 1840)
Rhantus suturalis (MacLeay, 1825)
Rheocricotopus atripes (Kieffer, 1913)
Rhopalomesites tardyi (Curtis, 1825)
Rhopalosiphoninus latysiphon (Davidson, 1912)
Rhopalosiphum insertum (Walker, 1849)
Rhopalosiphum nymphaeae (Linnaeus, 1761)
Rhyzobius lophanthae (Blaisdell, 1892)
Rodolia cardinalis (Mulsant, 1850)
Rugathodes acoreensis Wunderlich, 1992
Rugilus orbiculatus orbiculatus (Paykull, 1789)
Ruspolia nitidula (Scopoli, 1786)
Salticus mutabilis Lucas, 1846
Sancus acoreensis (Wunderlich, 1992)
Saprinus semistriatus (Scriba, 1790)
Sarcophaga africa (Wiedemann, 1824)
Savigniorrhipis acoreensis Wunderlich, 1992
Scaptomyza fava (Fallén, 1823)
Scaptomyza impunctata (Frey, 1945)
Scaptomyza pallida (Zetterstedt, 1847)
Scatella stagnalis (Fallen, 1813)
Scatella tenuicosta Collin, 1930
Scathophaga stercoraria (Linnaeus, 1758)
Scheloribates laevigatus (C.L. Koch, 1836)
Scolopendrellopsis subnuda (Hansen, 1903)
Scolopostethus decoratus (Hahn, 1833)
Scoparia aequipennalis Warren, 1905
Scoparia semiamplalis Warren, 1905
Scutigerella immaculata (Newport, 1845)
Scyllarides latus (Latreille, 1803)
Scyllarus arctus (Linnaeus, 1758)
Scymnus interruptus (Goeze, 1777)
Scymnus nubilis Mulsant, 1850
Segestria florentina (Rossi, 1790)
Sepedophilus lusitanicus Hammond, 1972
Sepsis lateralis Wiedemann, 1830
Sericoderus lateralis (Gyllenhal, 1827)

Sesamia nonagrioides (Lefèbvre, 1827)
Simulium azorense Carlsson, 1963
Sipha flava (Forbes, 1884)
Sitona gressorius (Fabricius, 1775
Sitona lepidus Gyllenhal, 1834
Sitona lineatus (Linnaeus, 1758)
Sitona puberulus Reitter, 1903
Sitophilus oryzae (Linnaeus, 1763)
Sitophilus zeamais Motschulsky, 1855
Sminthurides malmgreni (Tullberg, 1876)
Sminthurinus aureus (Lubbock, 1862)
Spelobia bifrons (Stenhammar, 1854)
Spelobia clunipes (Meigen, 1830)
Sphaericus gibboides (Boieldieu, 1854)
Sphaeridium bipustulatum Fabricius, 1781
Sphaerophoria nigra Frey, 1945
Sphaerophoria scripta (Linnaeus, 1758)
Spilopsyllus cuniculi (Dale, 1878)
Spinilimosina brevicostata (Duda, 1918)
Steatoda grossa (C.L. Koch, 1838)
Stegobium paniceum (Linnaeus, 1758)
Stelidota geminata (Say, 1825)
Stenolophus teutonus (Schrank, 1781)
Stenopus spinosus Risso, 1826
Stenus guttula guttula Müller, 1821
Stilbus testaceus (Panzer, 1797)
Stilpon nubilus Collin, 1926
Stomorhina lunata (Fabricius, 1805)
Stomoxys calcitrans (Linnaeus, 1758)
Strigamia crassipes (C.L. Koch, 1835)
Strophingia harteni Hodkinson, 1981
Suillia variegata (Loew, 1862)
Sunius propinquus (Brisout de Barneville, 1867)
Superodontella lamellifer (Axelson, 1903)
Sylvicola cinctus (Fabricius, 1787)
Sympetrum fonscolombii (Selys, 1840)
Symplecta hybrida (Meigen, 1804)
Synageles venator (Lucas, 1836)
Syritta pipiens (Linnaeus, 1758)
Tachyporus chrysomelinus (Linnaeus, 1758)
Tachyporus nitidulus (Fabricius, 1781)
Tachyura parvula (Dejean, 1831)
Talitrus pacificus Hurley, 1955
Talitrus saltator (Montagu, 1808)
Tamarixia actis (Walker, 1839)
Tanais dulongii (Audouin, 1826)
Tarphius azoricus Gillerfors, 1986
Tarphius wollastoni Crotch, 1867
Taylorilygus apicalis (Fieber, 1861)
Tebenna micalis (Mann, 1857)
Tegenaria domestica (Clerck, 1757)
Tegenaria pagana C.L. Koch, 1840
Tegenaria parietina (Fourcroy, 1785)
Telmatopelopia nemorum (Goetghebuer, 1921)
Tenuiphantes miguelensis (Wunderlich, 1992)
Tenuiphantes tenuis (Blackwall, 1852)
Tethina ochracea (Hendel, 1913)
Tetracanthella matthesi Gama, 1959
Tetragnatha extensa (Linnaeus, 1758)
Thalassomyia frauenfeldi Schiner, 1856
Thalassosmittia atlantica (Stora in Frey, 1936)
Thaumatomyia notata (Meigen, 1830)
Thoracochaeta brachystoma (Stenhammar, 1854)
Throscus elateroides (Heer, 1841)
Thysanoplusia orichalcea (Fabricius, 1775)
Tinea murariella Staudinger, 1859
Tomocerus minor (Lubbock, 1862)
Toya propinqua (Fieber, 1866)
Trachyopella hem Rohacek & Marshall, 1986
Trachyopella leucoptera (Haliday, 1836)
Trichocera maculipennis Meigen, 1818
Trichoniscus pusillus Brandt, 1833
Trichonta foresiana Stora, 1945
Trichophaga bipartitella (Ragonot, 1892)
Trigonotylus caelestialium (Kirkaldy, 1902)
Trimicra pilipes pilipes (Fabricius, 1787)
Trioza laurisilvae Hodkinson, 1990
Trychosis nigriventris (Habermehl, 1918)
Typhaea stercorea (Linnaeus, 1758)
Tyrophagus putrescentiae (Schrank, 1781)
Udea azorensis Meyer, Nuss & Speidel, 1997
Udea ferrugalis (Hübner, 1796)
Valenzuela burmeisteri (Brauer, 1876)
Valenzuela flavidus (Stephens, 1836)
Vanessa atalanta (Linnaeus, 1758)
Vanessa cardui (Linnaeus, 1758)
*Varroa destructo*r Anderson & Trueman, 2000
Viteus vitifoliae (Fitch, 1855)
Walckenaeria grandis (Wunderlich, 1992)
Xanthorhoe inaequata Warren, 1905
Xantho incisus Bugbee, 1951
Xenylla maritima Tullberg, 1869
Xestia c-nigrum (Linnaeus, 1758)
Xyleborinus saxesenii (Ratzeburg, 1837)
Xysticus cor Canestrini, 1873
Xysticus nubilus Simon, 1875
Zavrelimyia nubila (Meigen, 1830)
Zetha vestita (Brullé, 1838)
Zygiella x-notata (Clerck, 1757)

Phoronida - 1 species

Phoronis hippocrepia Wright, 1856

Echinodermata - 22 species

Araeosoma sp. Mortensen, 1903
Antedon bifida (Pennant, 1777)
Amphipholis squamata (Delle Chiaje, 1828)
Arbacia lixula (Linnaeus, 1758)
Arbaciella elegans Mortensen, 1910
Brissus unicolor (Leske, 1778)
Centrostephanus longispinus (Philippi, 1845)
Chaetaster longipes (Retzius, 1805)
Coscinasterias tenuispina (Lamarck, 1816)
Cucumaria sp. Blainville, 1830
Echinocardium cordatum (Pennant, 1777)
Hacelia attenuata Gray, 1840
Holothuria (Panningothuria) forskali Delle Chiaje, 1823
Holothuria (Platyperona) sanctori Delle Chiaje, 1823
Holothuria (Holothuria) tubulosa Gmelin, 1790
Marthasterias glacialis (Linnaeus, 1758)
Ophiocomina nigra (Abildgaard, in O.F. Müller, 1789)
Ophiactis virens (M. Sars, 1857)
Ophiothrix fragilis (Abildgaard, 1789)
Ophidiaster ophidianus (Lamarck, 1816)
Paracentrotus lividus (de Lamarck, 1816)
Sphaerechinus granularis (de Lamarck, 1816)

Tunicata - 9 species

Botryllus schlosseri (Pallas, 1766)
Clavelina lepadiformis (Müller, 1776)
Clavelina oblonga Herdman, 1880
Cystodytes dellachiajei (Della Valle, 1877)
Didemnum maculosum (Milne-Edwards, 1841)
Diplosoma listerianum (Milne-Edwards, 1841)
Distaplia corolla Monniot F. 1975
Eudistoma angolanum (Michaelsen, 1915)
Pyrosoma atlanticum Péron, 1804

Pisces - 255 species

Abudefduf luridus (Cuvier in Cuvier and Valenciennes, 1830)
Acanthocybium solandri (Cuvier, 1832)
Acantholabrus palloni (Risso, 1810)
Anguilla anguilla (Linnaeus, 1758)
Antennarius nummifer (Cuvier, 1817)
Anthias anthias (Linnaeus, 1758)
Aphanopus carbo Lowe, 1839
Apogon imberbis (Linnaeus, 1758)
Apterichtus caecus (Linnaeus, 1758)
Aspitrigla cuculus (Linnaeus, 1758)
Atherina presbyter Cuvier, 1829
Auxis thazard (Lacepède, 1800)
Balistes carolinensis Gmelin, 1789
Belone belone (Linnaeus, 1761)
Beryx decadactylus Cuvier, 1829
Beryx splendens Lowe, 1834
Blennius ocellaris Linnaeus, 1758
Bodianus scrofa (Valenciennes, 1839)
Boops boops (Linnaeus, 1758)
Bothus podas (Delaroche, 1809)
Brama brama (Bonnaterre, 1788)
Capros aper (Linnaeus, 1758)
Caranx crysos (Mitchill, 1815)
Carcharodon carcharias (Linnaeus, 1758)
Carcharhinus galapagensis (Snodgrass & Heller, 1905)
Carcharhinus longimanus (Poey, 1861)
Centracanthus cirrus Rafinesque, 1810
Centrolabrus caeruleus Azevedo, 1999
Chelon labrosus (Risso, 1827)
Chromis limbata (Valenciennes, 1833)
Conger conger (Linnaeus, 1758)
Coris julis (Linnaeus, 1758)
Coryphaena hippurus Linnaeus, 1758
Coryphoblennius galerita (Linnaeus, 1758)
Dasyatis pastinaca Linnaeus, 1758
Decapterus macarellus (Cuvier, 1833)
Dentex gibbosus (Rafinesque, 1810)
Diplecogaster bimaculata pectoralis Briggs, 1955
Diplodus sargus (Linnaeus, 1758)
Echiichthys vipera Cuvier, 1829
Elagatis bipinnulata (Quoy & Gaimard, 1825)
Enchelycore anatina (Lowe, 1838)
Engraulis encrasicolus (Linnaeus, 1758)
Epinephelus marginatus (Lowe, 1834)
Gaidropsarus granti (Regan, 1903)

Gaidropsarus guttatus (Collett, 1890)
Gobius paganellus Linnaeus, 1758
Gymnothorax unicolor (Delaroche, 1809)
Helicolenus dactylopterus (Delaroche, 1809)
Hippocampus guttulatus Cuvier, 1829
Hippocampus hippocampus (Linnaeus, 1758)
Katsuwonus pelamis (Linnaeus, 1758)
Kyphosus sectator (Linnaeus, 1758)
Labrus bergylta (Ascanius, 1767)
Labrus mixtus Linnaeus, 1758
Lepidopus caudatus (Euphrasen, 1788)
Lepidorhombus whiffiagonis (Walbaum, 1792)
Leucoraja fullonica (Linnaeus, 1758)
Lipophrys pholis (Linnaeus, 1758)
Lobotes surinamensis (Bloch, 1790)
Lophius piscatorius Linnaeus, 1758
Macroramphosus scolopax (Linnaeus, 1758)
Manta birostris (Walbaum, 1792)
Mobula tarapacana (Philippi, 1892)
Mola mola (Linnaeus, 1758)
Molva macrophthalma (Rafinesque, 1810)
Mora moro (Risso, 1810)
Mullus surmuletus Linnaeus, 1758
Muraena augusti (Kaup, 1856)
Muraena helena Linnaeus, 1758
Myliobatis aquila (Linnaeus, 1758)
Naucrates ductor (Linnaeus, 1758)
Ophioblennius atlanticus (Valenciennes, 1836)
Pagellus acarne (Risso, 1827)
Pagellus bogaraveo (Brunnich, 1768)
Pagrus pagrus (Linnaeus, 1758)
Parablennius incognitus (Bath, 1968)
Parablennius parvicornis (Valenciennes, 1836)
Parablennius ruber (Valenciennes, 1836)
Paraconger macrops (Günther, 1870)
Paralipophrys trigloides (Valenciennes, 1836)
Phycis blennoides (Brünnich, 1768)
Phycis phycis (Linnaeus, 1766)
Polyprion americanus (Bloch & Schneider, 1801)
Pomatomus saltatrix (Linnaeus, 1766)
Pomatoschistus pictus (Malm, 1865)
Pontinus kuhlii (Bowdich, 1825)
Pseudocaranx dentex (Bloch & Schneider, 1801)
Raja clavata Linnaeus, 1758
Ruvettus pretiosus Cocco, 1833
Sarda sarda (Bloch, 1793)
Sardina pilchardus (Walbaum, 1792)
Sarpa salpa (Linnaeus, 1758)
Scomber japonicus Houttuyn, 1782
Scorpaena maderensis Valenciennes, 1833
Scorpaena notata Rafinesque, 1810
Scorpaena porcus Linnaeus, 1758
Scorpaena scrofa (Linnaeus, 1758)
Seriola dumerili (Risso, 1810)
Seriola rivoliana Valenciennes, 1833
Serranus atricauda (Günther, 1874)
Serranus cabrilla (Linnaeus, 1758)
Sparisoma cretense (Linnaeus, 1758)
Sparus aurata Linnaeus, 1758
Sphoeroides marmoratus (Lowe, 1838)
Sphyraena viridensis Cuvier 1829
Sphyrna zygaena (Linnaeus, 1758)
Symphodus mediterraneus (Linnaeus, 1758)
Symphurus nigrescens Rafinesque, 1810
Syngnathus acus Linnaeus, 1758
Synodus saurus (Linnaeus, 1758)
Taeniura grabata (Geoffroy Saint Hilaire, 1817)
Thalassoma pavo (Linnaeus, 1758)
Thorogobius ephippiatus (Lowe, 1839)
Trachinotus ovatus (Linnaeus, 1758)
Trachurus picturatus (Bowdich, 1825)
Tripterygion delaisi Cadenat & Blache, 1970
Xiphias gladius Linnaeus, 1758
Xyrichtys novacula (Linnaeus, 1758)
Zenopsis conchifera (Lowe, 1852)
Zeus faber Linnaeus, 1758

Anfibia - 2 species

Rana ridibunda perezi Seoane, 1885
Rana esculenta Linnaeus, 1758

Reptilia - 7 species

Caretta caretta (Linnaeus, 1758)
Lacerta dugesii Milne-Edwards, 1829
Dermochelys coriacea (Vandelli, 1761)
Lepidochelys kempii (Garman, 1880)
Eretmochelys imbricata (Linnaeus, 1766)
Lepidochelys olivacea (Eschscholtz, 1829)
Chelonia mydas (Linnaeus, 1758)

Mammalia - 41 species

Balaenoptera acutorostrata Lacépède, 1804
Balaenoptera borealis Lesson, 1828
Balaenoptera musculus (Linnaeus, 1758)
Balaenoptera physalus (Linnaeus, 1758)
Bos taurus Linnaeus, 1758
Capra aegagrus Linnaeus, 1758
Delphinus delphis Linnaeus, 1758
Eubalaena glacialis Muller, 1776
Globicephala macrorhynchus Gray, 1846
Globicephala melas (Traill, 1809)
Grampus griseus (Cuvier, 1812)
Hyperoodon ampullatus (Forster, 1770)
Kogia breviceps (de Blainville, 1838)
Kogia simus Owen, 1866
Megaptera novaeangliae (Borowski, 1781)
Melamphaes typhlops (Lowe, 1843)
Melanocetus johnsonii Günther, 1864
Melanonus zugmayeri Norman, 1930
Mesoplodon bidens (Sowerby, 1804)
Mesoplodon europaeus Gervais, 1855
Mesoplodon mirus True, 1913
Mesoplodon densirostris (de Blainville, 1817)
Mus domesticus Rutty, 1772
Mustela nivalis Linnaeus, 1766
Mustela putorius Linnaeus, 1758
Myotis myotis (Borkhausen, 1797)
Nyctalus azoreum (Thomas, 1901)
Orcinus orca (Linnaeus, 1758)
Oryctolagus cuniculus (Linnaeus, 1758)
Ovis aries Linnaeus, 1758
Phocoena phocoena (Linnaeus, 1758)
Physeter catodon Linnaeus, 1758
Pipistrellus maderensis (Dobson, 1878)
Pseudorca crassidens (Owens, 1846)
Rattus norvegicus (Berkenhout, 1769)
Rattus rattus (Linnaeus, 1758)
Stenella coeruleoalba (Meyen, 1833)
Stenella frontalis (Cuvier, 1829)
Steno bredanensis (Lesson, 1828)
Tursiops truncatus (Montagu, 1821)
Ziphius cavirostris Cuvier, 1823

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  URL: http://www.horta.uac.pt/port/
  (accessed in July 2008)

20. ADDRESSES

20.1. CONTACT ADDRESS OF THE PROPOSED BIOSPHERE RESERVE

Secretaria Regional do Ambiente e do Mar
Rua Cônsul Dabney - Colónia Alemã
Apartado 140
9900-014 HORTA
PORTUGAL

Telephone: + 351 292 207 300

Fax: + 351 292 292 004

E-mail address: info.sram@azores.gov.pt

ANNEXES

SUPPORTING STATEMENTS

biosfera AÇORES

Declaração de apoio à candidatura da Ilha das Flores, Região Autónoma dos Açores a Reserva da Biosfera – Programa MAB – UNESCO

Suporting statment of the application of the Island of Flores – Azores, Autonomous Region, Portugal to become Biosphere Reserve – MAB Programe – UNESCO

Pela presente, venho manifestar o meu acordo e apoio à candidatura a reserva da Biosfera, por parte da Ilha das Flores.

By this I declare the support the application of Flores Island to become Biosphere Reserve under the MAB Programe.

Nome/Name ANTONIO SAN BLAS ALVAREZ

Instituição/institution RESERVA DE LA BIOSFERA LA PALMA - CANARIAS - ESPAÑA

Data/Date 24 de JUNIO de 2008

Assinatura/Signature

biosfera AÇORES

Declaração de apoio à candidatura da Ilha das Flores, Região Autónoma dos Açores a Reserva da Biosfera – Programa MAB – UNESCO

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Nome/Name Amadou Moctar NIANG

Instituição/institution Ministère de l'Environnement Sénégal

Data/Date 24 Juillet 2008

Assinatura/Signature

biosfera AÇORES

Declaração de apoio à candidatura da Ilha das Flores, Região Autónoma dos Açores a Reserva da Biosfera – Programa MAB – UNESCO

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Nome/Name Francisco José Cantos Mengs

Instituição/institution Organismo Autónomo Parques Nacionales (MMAMRM) España

Data/Date 24.07.2008

Assinatura/Signature

biosfera AÇORES

Declaração de apoio à candidatura da Ilha das Flores, Região Autónoma dos Açores a Reserva da Biosfera – Programa MAB – UNESCO

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Nome/Name MENÉNDEZ-PIDAL JUAN ANTONIO

Instituição/institution ARBIOS

Data/Date 24-07-08.

Assinatura/Signature

biosfera AÇORES

Declaração de apoio à candidatura da Ilha das Flores, Região Autónoma dos Açores a Reserva da Biosfera – Programa MAB – UNESCO

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Nome/Name ANTONIA AGAMA MOTA

Instituição/institution OFICINA PROGRAMA MAB MINISTERIO MEDIO AMBIENTE y MEDIO RURAL y MARINO DEL GOBIERNO DE ESPAÑA

Data/Date 24 - Julio 2008

Assinatura/Signature

biosfera AÇORES

Declaração de apoio à candidatura da Ilha das Flores, Região Autónoma dos Açores a Reserva da Biosfera – Programa MAB – UNESCO

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Nome/Name MYRIAM YBOT

Instituição/institution RESERVA DE BIOSFERA – LANZAROTE (CANARIAS)

Data/Date 24 - JULIO - 2008

Assinatura/Signature

biosfera AÇORES

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Nome/Name OULD CHEIKH BOUYA, DIEH
CONSEILLER JURIDIQUE

Instituição/institution MINISTERE AGRICULTURE ET ELEVAGE / MAURITANIE

Data/Date 24-07-08

Assinatura/Signature

biosfera AÇORES

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Nome/Name JOÃO SOUSA CORDEIRO

Instituição/institution INSTITUTO DA BIODIVERSIDADE E DAS ÁREAS PROTEGIDAS (I.B.A.P) - RESERVA DA BIOSFERA ARQUIPÉLAGO Baleia Bigarão

Data/Date 24 DE JULHO de 2008

Assinatura/Signature

biosfera AÇORES

Declaração de apoio à candidatura da Ilha das Flores, Região Autónoma dos Açores a Reserva da Biosfera – Programa MAB – UNESCO

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Nome/Name SANTIAGO CARO QUINTANA

Instituição/institution CONSEJERIA MEDIO AMBIENTE CABILDO DE GRAN CANARIA

Data/Date 24-04-08

Assinatura/Signature

biosfera AÇORES

Declaração de apoio à candidatura da Ilha das Flores, Região Autónoma dos Açores a Reserva da Biosfera – Programa MAB – UNESCO

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By this I declare the support the application of Flores Island to become Biosphere Reserve under the MAB Programe.

Nome/Name Vânia Teresa Antunes Ramos d'Pina Vasconcelos

Instituição/institution Direcção Geral do Ambiente de Cabo Verde

Data/Date 24/07/08

Assinatura/Signature

biosfera AÇORES

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By this I declare the support the application of Flores Island to become Biosphere Reserve under the MAB Programe.

Nome/Name Francisco Javier Sosa Scavedra

Instituição/institution Consejeria Medio Ambiente Canarias

Data/Date 24 de Julio de 2008

Assinatura/Signature F. Sosa Scavedra

biosfera AÇORES

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By this I declare the support the application of Flores Island to become Biosphere Reserve under the MAB Programe.

Nome/Name FASSI DRISS

Instituição/institution Secrétaire Général du MAB du MAROC

Data/Date 24/07/2008

Assinatura/Signature

biosfera AÇORES

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By this I declare the support the application of Flores Island to become Biosphere Reserve under the MAB Programe.

Nome/Name BENTYANE Mohamed

Instituição/institution MAROC

Data/Date 24 juillet 2018

Assinatura/Signature

ANNEX TO BIOSPHERE RESERVE NOMINATION FORM

Annex to Biosphere Reserve Nomination Form
MABnet Directory of Biosphere Reserves
Biosphere Reserve Description

ADMINISTRATIVE DETAILS

Country: PORTUGAL

Name of BR: Flores Island (Azores) Biosphere Reserve

Year designated: (to be completed by MAB Secretariat)

Administrative authorities: (17.8)

Contact:

Secretaria Regional do Ambiente e do Mar

Rua Cônsul Dabney – Colónia Alemã

Apartado 140

9900-014 HORTA

PORTUGAL

Telephone: + 351 292 207 300

Fax: + 351 292 292 004

E-mail: info.sram@azores.gov.pt

Related links (web sites): www.azores.gov.pt

DESCRIPTION

General description:

The proposed Biosphere Reserve covers the total terrestrial area of Flores Island (Archipelago of the Azores) as well as the oceanic area reaching a distance of 3 miles from the coast. Flores Island is the surface part of a seamount located near the Mid Atlantic Riff, originated from the volcanic activity which started less than 10 My. The island as an oval shape with a total area of 14.300 ha. The high central plateau, with an average altitude of 600-700 m above sea level is the major topographic feature of the Island. It is in this area where we can find some of the most important natural habitats of the island as the high altitude turf zones. These habitats have also a major role in the hydrological systems of the island as well as in the landscape features of Flores Island. The island coasts are mostly high cliffs and several small capes, islands and coastal caves as a result of the continuous maritime erosion. The coastal zone is the nesting location for

several marine bird species. Special remark to the Roseate Tern (*Sterna dougallii*) that has around 40% of it's European population nesting in the coastal zone of the Flores Island.

Flores Island was not inhabited by the time of the Portuguese discoveries. After a first try for the human settlement in 1470, there was a definitive settlement during the XVI Century under the guidance of João Fonseca. The first colonists came from the Alentejo, in the South of Portugal, from Madeira Island and from Terceira Island (Azores). During the XX Century the population has decreased, mostly due to emigration and aging. Between the census of 1900 and 2001, the population numbers have changed from 8.127 to 3.995 persons. In 2006 the population was 4.059 (1,67% of the Archipelago's population), sugesting some inversion of the trend. In general, Flores Island has a young demographic structure but aging is the major tendency. The majority (61%) of the active people works in the tertiary, 24% in the secondary sector (especially in the milk industry) and only 16% belongs to the primary sector.

All zones of the proposed Biosphere Reserve are contiguous and all of them have a distinct feature making each of them as a land management unit:

- The Nucleus Zone coincide with natural protected areas included in the Island Natural Park under the categories of Natural Reserve or Natural Monument;
- The Buffer Zone correspond with the zones of the Island Natural Park classified as Protected Area for the Management of Species or Habitats, Protected Landscape Area and Area for the protection and Resources Management;
- The Transition Zone includes marine, agro-forestry and urban areas submitted to land and marine specific juridical regulations oriented to a responsible and sustainable management and exploitation.

Major ecosystem type: Sub-tropical oceanic island

Major habitats & land cover types: High altitude and wet zone; marine and coastal zone; zone rural; urban zone

Location: Latitude: 39º24' N ; Longitude: 31º11' W

Area (ha):

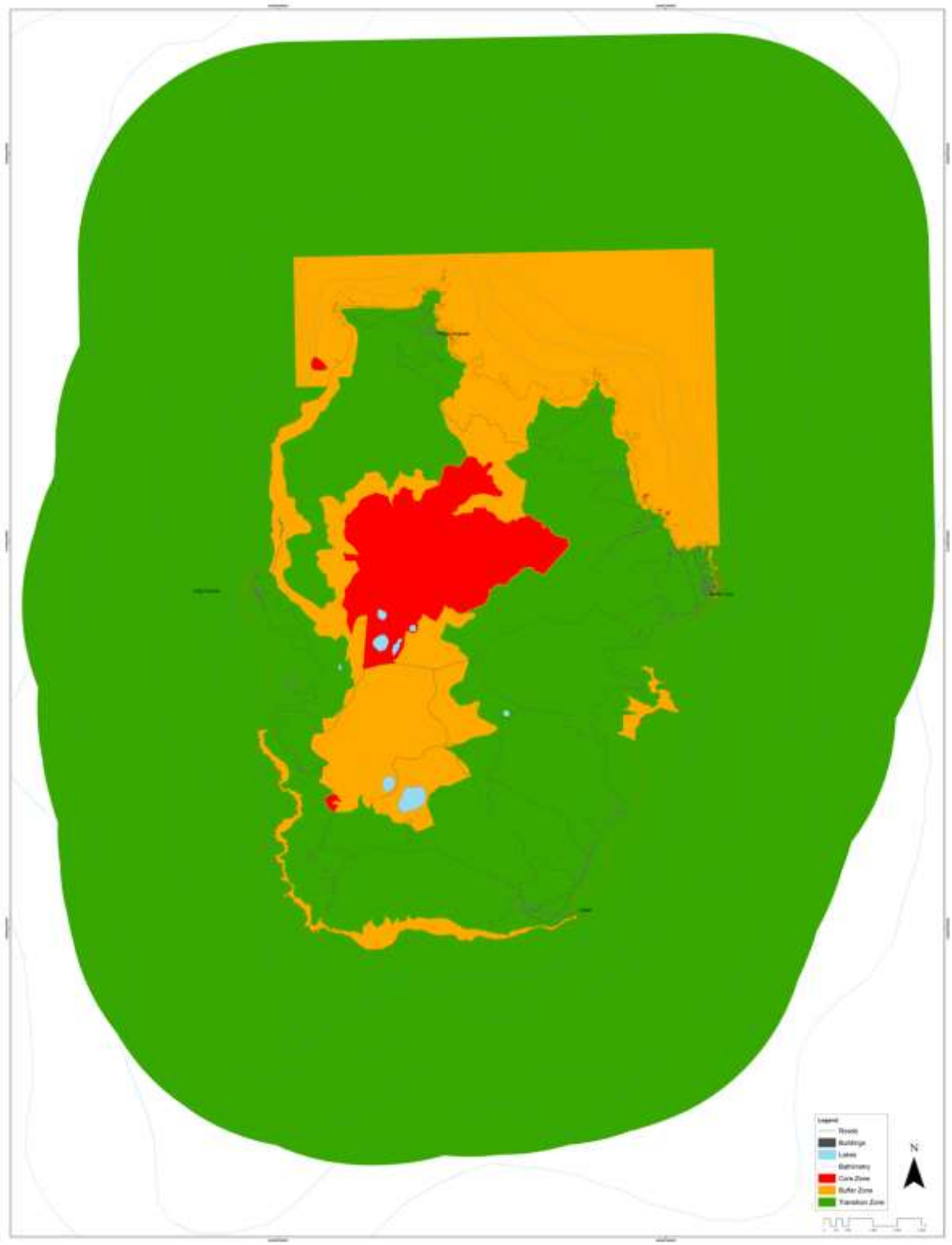
Total: 58.619

Core Area(s): 1.615

Buffer Zone(s): terrestrial, 3.169; marine, 3.974.

Transition Area(s): terrestrial, 9.332; marine, 40.529

Different existing zonation:



Altitudinal range (metres above sea level): 914

RESEARCH AND MONITORING

Brief description:

During the last years there were several scientific research projects covering both the natural, environmental and human features of the Flores Island. Most of these projectes were promoted iwith the aim of tcollecting specific information in order to support the general management of the human and natural systems of the island. The resulting information covering from human health to geology, monitoring of species and habitats is already available and will be the basis for future work, namely promoted by the Biosphere Reserve.

Specific variables:

Abiotic		Biotic	
Abiotic factors	√	Afforestation/Reforestation	√
Acidic deposition/Atmospheric factors	√	Algae	√
Air quality	√	Alien and/or invasive species	√
Air temperature	√	Amphibians	√
Climate, climatology	√	Arid and semi-arid systems	
Contaminants		Autoecology	√
Drought		Beach/soft bottom systems	√
Erosion	√	Benthos	√
Geology	√	Biodiversity aspects	√
Geomorphology	√	Biogeography	√
Geophysics		Biology	√
Glaciology		Biotechnology	
Global change		Birds	√
Groundwater	√	Boreal forest systems	
Habitat issues	√	Breeding	√
Heavy metals		Coastal/marine systems	√
Hydrology	√	Community studies	√
Indicators		Conservation	√
Meteorology	√	Coral reefs	
Modeling		Degraded areas	
Monitoring/methodologies	√	Desertification	
Nutrients	√	Dune systems	
Physical oceanography	√	Ecology	√
Pollution, pollutants		Ecosystem assessment	√
Siltation/sedimentation		Ecosystem functioning/structure	√
Soil	√	Ecotones	√
Speleology	√	Endemic species	√
Topography	√	Ethology	
Toxicology		Evapotranspiration	
UV radiation		Evolutionary studies/Palaeoecology	
		Fauna	√
		Fires/fire ecology	
		Fishes	√
		Flora	√
		Forest systems	√
		Freshwater systems	√
		Fungi	√
		Genetic resources	
		Genetically modified organisms	
		Home gardens	√
		Indicators	
		Invertebrates	√
		Island systems/studies	√
		Lagoon systems	√
		Lichens	√
		Mammals	√
		Mangrove systems	
		Mediterranean type systems	
		Microorganisms	
		Migrating populations	
		Modeling	
		Monitoring/methodologies	√
		Mountain and highland systems	√
		Natural and other resources	√
		Natural medicinal products	√
		Perturbations and resilience	
		Pests/Diseases	
		Phenology	

Specific variables (cont.):

Abiotic (cont.)		Biotic (cont.)	
		Phytosociology/Succession	
		Plankton	
		Plants	√
		Polar systems	
		Pollination	
		Population genetics/dynamics	
		Productivity	
		Rare/Endangered species	√
		Reptiles	
		Restoration/Rehabilitation	
		Species (re)introduction	
		Species inventorying	
		Sub-tropical and temperate rainforest	
		Taxonomy	
		Temperate forest systems	√
		Temperate grassland systems	
		Tropical dry forest systems	
		Tropical grassland and savannah systems	
		Tropical humid forest systems	
		Tundra systems	
		Vegetation studies	√
		Volcanic/Geothermal systems	√
		Wetland systems	√
		Wildlife	
		UNESCO	

Specific variables (cont.):

Socio-economic		Integrated monitoring	
Agriculture/Other production systems	√	Biogeochemical studies	
Agroforestry	√	Carrying capacity	
Anthropological studies		Conflict analysis/resolution	
Aquaculture		Ecosystem approach	√
Archaeology		Education and public awareness	√
Bioprospecting		Environmental changes	√
Capacity building	√	Geographic Information System (GIS)	
Cottage (home-based) industry		Impact and risk studies	
Cultural aspects	√	Indicators	
Demography		Indicators of environmental quality	√
Economic studies		Infrastructure development	√
Economically important species	√	Institutional and legal aspects	
Energy production systems		Integrated studies	
Ethnology/traditional practices/knowledge	√	Interdisciplinary studies	
Firewood cutting		Land tenure	
Fishery	√	Land use/Land cover	√
Forestry	√	Landscape inventorying/monitoring	√
Human health	√	Management issues	√
Human migration		Mapping	√
Hunting		Modeling	√
Indicators		Monitoring/methodologies	√
Indicators of sustainability		Planning and zoning measures	√
Indigenous people's issues		Policy issues	√
Industry		Remote sensing	
Livelihood measures		Rural systems	√
Livestock and related impacts		Sustainable development/use	√
Local participation		Transboundary issues/measures	
Micro-credits		Urban systems	√
Mining		Watershed studies/monitoring	√
Modeling			
Monitoring/methodologies			
Natural hazards			
Non-timber forest products			
Pastoralism			
People-Nature relations	√		
Poverty			
Quality economies/marketing	√		
Recreation	√		
Resource use	√		
Role of women			
Sacred sites			
Small business initiatives			
Social/Socio-economic aspects	√		
Stakeholders' interests	√		
Tourism	√		
Transports	√		

CARTOGRAPHY