

THE CONSERVATION OF IMPORTANT WETLAND,  
LAGOONAL, HABITATS IN THE AÇORES.  
AND A PROPOSAL FOR FAJÃ DOS CUBRES  
AND FAJÃ DE SANTO CRISTO, SÃO JORGE,  
TO BE DESIGNATED AS A WORLD HERITAGE SITE

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**Summary:** On the nine islands that constitute the Açores Archipelago, there are four sites on São Jorge (2), Terceira (1) and Pico (1), all in the central group, and which can be classified as lagoons and, as such, are important intertidal habitats. The former marsh system at Paúl and Belo Jardim on Terceira has, however, been reclaimed leaving but a quarry, Cabo da Praia, that is developing into a lagoon system and attracts resident and migrating sea birds but has been recently developed as an oil storage facility. Similarly the marsh at Lajes do Pico, on Pico, has undergone extensive development over time but still retains elements of its former status. This site is suitable for broad-scale educational purposes.

Conversely, the adjacent, contemporaneous and sister lagoonal sites of Fajã dos Cubres and Fajã de Santo Cristo on the island of São Jorge, are remote, relatively undeveloped, have great geological, geomorphological, marine ecological, conservation, historical and cultural significance and it is herein proposed that they should as designated as World Heritage Sites under the World Heritage Convention.

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**Sumário:** Nas nove ilhas que constituem o arquipélago dos Açores existem quatro locais em São Jorge (2), Terceira (1) e Pico (1), ilhas do grupo central, que podem ser classificados como lagoas e que, como tal, são habitats intertidais importantes. O anterior sistema de paúl do Paúl e

do Belo Jardim na Terceira foi, no entanto, recuperado, o que faz com que apenas uma pedreira, Cabo da Praia, esteja a evoluir para um sistema de lagoa capaz de atrair aves marinhas residentes e migratórias, tendo, contudo e recentemente, sido transformado em local de armazenamento de combustível. Igualmente, o paúl das Lajes do Pico, na ilha do Pico, sofreu um extenso desenvolvimento, ao longo do tempo mas ainda retém elementos do seu estado anterior. Este local é adequado para fins educacionais de largo espectro.

Por outro lado, os locais de Fajã dos Cubres e Fajã de Santo Cristo, lagoas irmãs adjacentes e contemporâneas da ilha de São Jorge, são remotos, relativamente pouco desenvolvidos, têm grande importância dos pontos de vista da geologia, geomorfologia, ecologia marinha, conservação, história e cultura, o que nos leva a propor que sejam escolhidos como Locais de Património Mundial da Humanidade de acordo com a Convenção de Património Mundial.

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**Palavras-chave:** zonas húmidas costeiras, lagoas, Convenção de Património Mundial, Convenção de Ramsar, União Europeia.

## INTRODUCTION

The Açores Archipelago is located in the North Atlantic Ocean, between latitudes 36°55' and 39°43' North, and longitudes 24°46' and 31°16' West, about 1,500 km from Europe and 1,900 km from North America. The islands are, thus, remote. The archipelago comprises nine islands and several islets, including the Formigas, of recent volcanic origin, spread over 600 kilometres of ocean along a northwest-southeast axis and aged between 0.3 and 8 million years (FRANÇA *et al.*, 2003). They cluster geographically into three groups:

(i), the western group with the islands of Flores and Corvo; (ii), the central group comprising the islands of Faial, Pico, São Jorge, Graciosa and Terceira and (iii), the eastern group with São Miguel and Santa Maria.

I first visited the Açores in 1965 as a member of the Chelsea (now King's) College), University of London, Açores Expedition and published my, albeit simple, observations on the molluscs and on Fajã de Santo Cristo, in São Jorge, subsequently (MORTON, 1967). Twenty-three years and a brought up family were to elapse

before visiting the islands again – this time São Miguel, not São Jorge, under the auspices of the First International Workshop of Malacology convened by Professor A. M. de Frias Martins at Vila Franco do Campo in 1988. I have subsequently visited the archipelago many times and seen all of the nine islands principally in connection with the research for and writing of the book *Ecologia Costeira dos Açores* (*Coastal Ecology of the Açores*) published in 1998 (MORTON *et al.*, 1998a). And thus, although I am not Açorean, I feel that a large part of me is.

Chapter 10 of *Ecologia Costeira dos Açores* dealt with marine conservation in the archipelago and re-described the sites identified by SANTOS *et al.* (1994) as being of protection and conservation interest but adding further to the list particularly with regard to the few wetland areas to be found in the Açores. Coastal lagoons are shallow bodies of water separated from larger bodies, that is, the sea, by barriers. Lagoons are commonly divided into two categories, atoll and coastal, the former situated behind a coral reef barrier and occurring, therefore, only in the tropics, the latter worldwide. Coastal lagoons are often, but not necessarily, associated with riverine estuaries and are separated from the sea by pebbles, gravel and sand barriers – the latter in temperate environments topped by dune

fields. They are also, typically, young and dynamic and may be short-lived in overall geological terms.

NYBAKKEN (2003) described coastal lagoons as coupled systems, which, under the influence of the tides and freshwater runoff are both the givers and receivers of nutrients and sediments, which accumulate over time. Such exchanges are facilitated by inlets. The number and size of the inlets, rates of precipitation, evaporation and the inflows of freshwater all affect the character of a lagoon. Typically too, lagoons are fringed by mangroves in the tropics and marsh plants, *Juncus*, in temperate zones, and are host to unique suites of enthic organisms which interact dynamically with the lagoon floor sediments to create a rich ecosystem that is, for example, especially important for resident and migrating sea birds.

In the past, lagoonal wetlands/marshlands were not regarded as important and because of this, worldwide, many have been drained, filled and developed over (TEAL & TEAL, 1969). In the U.S.A., for example, 20,000 hectares have been lost to development in San Francisco Bay and approximately 4,000 square kilometres in the Mississippi Delta alone (MUDD, 2013). In that small southeastern quadrant of England where I now live, again for example, saltmarshes and their associated lagoons have been eroding rapidly for about the last 50 years, at

a continuing rate of about 40 hectares per year (HUGHES & PARAMOR, 2004). It is recognised today, however, that, again worldwide, each lagoon is unique and, as a consequence, they are receiving degrees of protection and conservation not hitherto contemplated.

On 21 May 1992, the European Communities published a COUNCIL DIRECTIVE (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora in the Union. The directive urged member states to bring into force laws, regulations and administrative provisions necessary to comply with it within two years of the notification. Member states were further required to communicate the main provisions of those national laws, which they adopt, with the Commission.

From the above (SANTOS *et al.*, 1994; MORTON *et al.*, 1998a), it is clear that independent academics have provided the Government of the Autonomous Region of the Açores with the framework that enabled it to comply with the European Union's Directive with regard to the marine environment. With respect to Annex I of the Council Directive (Natural Habitat Types of Community Interest whose Conservation Requires the Designation of Special Areas of Conservation), there are identified within, under Open Sea and Tidal Areas, a number of marine habitats of partic-

ular importance and of which N° 21 – Lagoons – are classified as priority habitat types. MORTON *et al.* (1998a), in particular, also recognised Açorean lagoons as being of conservation priority and referred to specific research papers that had identified them as such (MORTON & TRISTÃO DA CUNHA, 1993; 2014; MORTON *et al.*, 1995, 1996, 1997, 1998b).

Coastal lagoons, therefore, constitute sites for which there is some national/regional obligation to establish Special Areas of Conservation (SAC's). To assist with this, a protected area is defined as: "*A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*" (DUDLEY, 2008).

In this paper I review and synthesise the existing knowledge available for four Açorean intertidal areas that can be readily classified as lagoons and reiterate earlier arguments that they should not just be recognised as such, but managed and used for the benefits of the Açorean people in general but also tourists (of all ecosensitive categories) such that there are constructed inter- and intra-community wishes for their continued protection, conservation and sustainable exploitation, and recognised as assets not to be squandered but invested in.

## THE AÇOREAN LAGOONAL WETLANDS

BROWN *et al.* (1997) defined saline coastal lagoons as: “*areas of shallow, coastal saline water, [either] wholly or partially separated from the sea by sandbanks, shingle, or less frequently rocks [or boulder ramparts in the Açores]*” Within the framework of this definition, four intertidal areas can be recognised as definable Açorean lagoons and of which two are outstanding examples of such an ecosystem. Another lagoon-like system at Ilhéu de Vila Franco do Campo on São Miguel is not a true lagoon, there being no barrier behind which the contained water sits. Rather, as the remnant of an offshore volcanic cone, it is more akin to a drowning tropical atoll, or guyot, but without the corals (MORTON *et al.*, 1998a) and whose geomorphology and intertidal ecology was first described by MORTON (1990). Furthermore, with no significant input of freshwater into the Ilheu lagoon, it is not, by definition, a true coastal lagoon – there not being, for example, any fringing halophytic marshland plants. This site has, moreover, already been designated as a Natural Reserve (Decreto Legislativo Regional N° 3/83/A of 3 March 1983 by the Açorean Legislative Assembly, although, during the summer months, its status is neither respected by the large numbers of (local) tourists who

seek recreational pleasure in its crater, nor enforced.

### *Lajes do Pico, Pico*

The Lajes do Pico marsh is situated on the south coast of Pico and lies on a boulder strewn coastal platform, Poça da Barra, formed by a lava flow. It is protected naturally from the sea by a tall boulder rampart fringing its southeastern margin. Incursing tidal waters flood around the boulder rampart flooding the southeastern component of the platform and creating an expanse of marshland framed by *Juncus acutus* L. and, more marginally, by *Juncus maritimus* Lam. A shallow pond (40 metres by 35 metres), Poca do Cão, characterises the centre of the marsh and is protected from direct tidal inundation by the seaward rampart. It thus experiences dampened tidal rises and falls by percolation of seawater through the boulder field and, importantly, is also influenced directly by rainfall and freshwater dilution by percolation from the land (MORTON *et al.*, 1996). The flora and fauna of, in effect, this definable, albeit tiny, lagoon have been described by MORTON *et al.* (1998a). The zonation pattern expressed by the intertidal biota on the Lajes do Pico platform and marsh

has been described by ÁVILA (1998). More recently, the same author and others (ÁVILA *et al.*, 2000, 2011) have described and discussed the platform in relation to the cultural heritage of Lajes – the village that sits behind the protective shores of the platform. Lajes is important culturally for it was the centre of the Açorean whaling industry. The last sperm whale (*Physeter macrocephalus* Linnaeus, 1758) was caught and landed here by Lajes whalers in November 1987. Thereafter, the Açorean people rejected whaling but the proud maritime history of the Lajes mariners is celebrated here every August in a week-long *Semana dos Baleeiros*, or Whaler's Week. This attracts many local and overseas tourists. The authors of *Lajes do Pico "À ban baxe muro"* re-state the importance of the Boca da Barra marsh and its central pool within the wider framework of the Açorean intertidal and explain how the site can be used in a broad ecological and cultural context, by the young people of the archipelago and elsewhere to study and understand the principles of marshland ecology, marine environmental protection and, moreover, experience the rich cultural heritage of the Lajes people.

### ***Quarry at Cabo da Praia, Terceira***

There were once large, lagoonal, wetlands at Paúl and Belo Jardim, Praia

da Vitória on Terceira. Uniquely for the Açores, this lagoon and associated *Juncus acutus* and *Juncus maritimus* marsh was formed behind a barrier of sand. Southward flowing currents sweeping against Ponta de Santa Catarina, south of Praia da Vitória deposited, over time, considerable amounts of sand in Baía da Praia. This has produced the longest, three-kilometre, sand beach in the Açores, which was once fringed by a 300-metre wide dune field (AGOSTINHO, in BANNERMAN & BANNERMAN, 1966). Behind this barrier sat a lagoonal marsh with, initially, the village of Praia da Vitória in the centre. As the township has grown, however, the ecological continuum of the lagoon became progressively divided into two – Paúl to the north and Belo Jardim to the south.

When visited in 1997 by MORTON *et al.* (1997), the marsh at Paúl had been reduced to a small pool and its sister at Belo Jardim had suffered a similar fate. Now, it has disappeared – replaced by a football field. Paúl was, however, recently (13 December 2012) classified as a Site of International Importance under the Ramsar Convention relative to the List of Wetlands of International Importance, especially with regard to protection of its habitat for aquatic birds. MORTON *et al.* (1997), however, discovered a coastal quarry at Cabo da

Praia, also on Terceira, and which was constructed in ~1988. When studied for the book *Coastal Ecology of the Açores* (MORTON *et al.*, 1998a) the quarry was found to contain tidally inundated pools filled by percolation through the surrounding basaltic sea wall. It was also shown to be home to numerous species of coastal plants, two species of *Assimineia* (Gastropoda), the amphipod *Orchestia mediterranea* Costa, 1853 and, a near-unique (for the Açores) collection of migrating coastal birds including some American vagrants, for instance, the Hudsonian godwit (*Limosa haemastica* [Linnaeus, 1758]). Since first described by MORTON *et al.* (1997), growing numbers of bird species have been recorded from the quarry at Cabo da Praia with, now, 26 species identified. It is today considered to be the most significant

coastal wader site in the archipelago. Regrettably, along with the destruction of the marsh at Paúl and Belo Jardim, the entrance to the unique, man-created, quarry habitat at Cabo da Praia, has been largely developed as a fuel storage facility. A postscript to this development, however, is that one of the companies which has a concession at Pedreira do Cabo da Praia on Terceira, adjacent to the quarry, did, in March 2010, undertake a cleanup of the floor of Cabo da Praia. Hence, and despite this cosmetic improvement, the largest, most mature, lagoonal wetland in the Açores has disappeared from Terceira. But, what a wonderful project the quarry would have constituted to test Darwin's theories of how coastal plants and animals have colonized these remote Açorean shores if it had been left alone.

#### THE FAJÃS DOS CUBRES AND SANTO CRISTO, SÃO JORGE

Of all the Açorean scenery none is more magnificent than the view from the top of the near-vertical cliffs above the north shore of the island of São Jorge (FIGURE 1). From near the middle of the island's 27-kilometre length, looking east, one can see two coastal platforms each containing a lagoon, or *fajã*. Fajã dos Cubres and Fajã de Santo Cristo were formed contemporaneously by massive land-

slides resulting from an earthquake of 9 July 1757 with its epicentre at Calheta – “*the most violet seismic phenomenon felt in these islands after their settlement*” (AGOSTINHO, 1935). FORJAZ & FERNANDEZ (1975) concluded that the volume of debris dislocated from the cliffs would have been six times greater than that presently in existence.



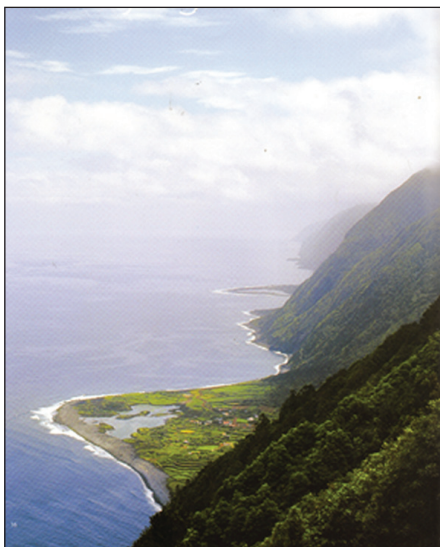


FIGURE 1: Fajã dos Cubres and, further away, Fajã de Santo Cristo on the north shore of São Jorge and seen from the mountain top behind.

In 1924, [Padre] CUNHA (1981) recorded that the lagoon was, at the time he visited it, closed to the sea and bigger than today. He recorded that then, for example, one could see the Islet of Topo, some nine kilometres to the east on the western tip of São Jorge from the northernmost shore of the Santo Cristo lagoon. Not now, however. The present, shrunken, landforms of the two platforms have been, subsequent to 1757, shaped by a combination of, especially, marine and, to a lesser extent, freshwater erosion. Today, both *fajãs* enclose lagoons (*lagoa*), which are separated and protected from the sea by boulder

ramparts. Both also receive freshwater inputs from groundwater reservoirs in the island, and the gently sloping platforms landward of the lagoons are occupied by tiny agricultural and fishing villages.

### *Fajã dos Cubres, São Jorge*

The lagoon of Fajã dos Cubres is situated on the north shore of São Jorge and is adjacent to and some two kilometres to the west of Fajã de Santo Cristo. The *fajã* (FIGURE 2) comprises a shallow, two-metre deep, lagoon contained within a coastal platform and protected from the sea by a tall boulder rampart.

First studied in any detail by MORTON *et al.* (1995) and, hitherto, considered lacustrine, these authors showed that the lagoon is influenced primarily by freshwater draining from the land behind to the southeast, but is also affected by seawater percolating with rise and fall of the tides through the seaward rampart to the north. In 1951, a small causeway was built between the land, central lagoonal islets and the seaward rampart, dividing the lagoon into eastern and western sections, which have thereby become predominantly freshwater and seawater influenced, respectively (FIGURE 3). The lagoon is fringed virtually along its entire perimeter by a *Juncus acutus* marsh and which, in



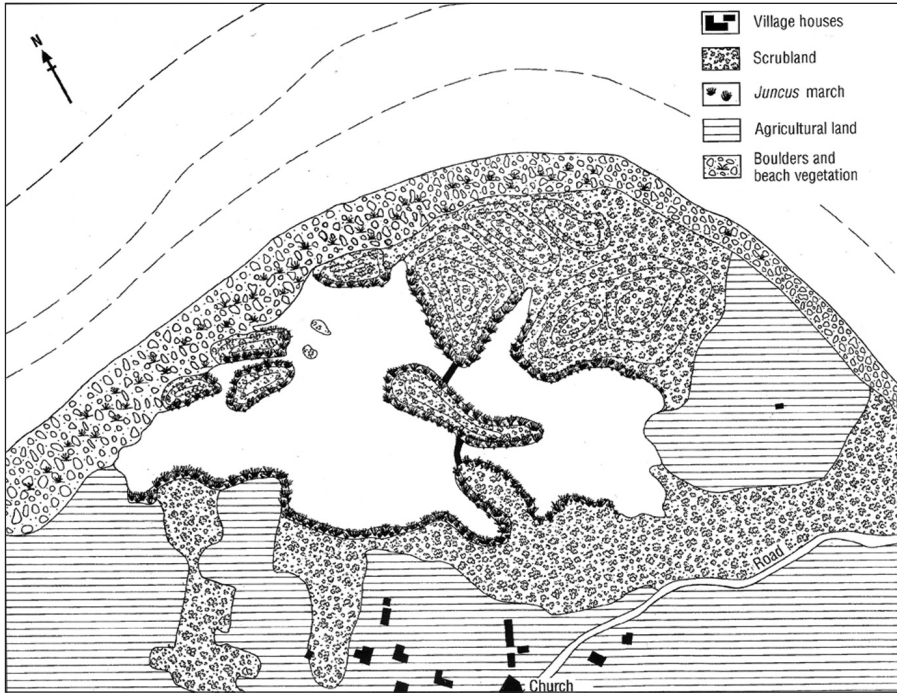


FIGURE 2: A map of Fajã dos Cubres (after MORTON *et al.*, 1998).

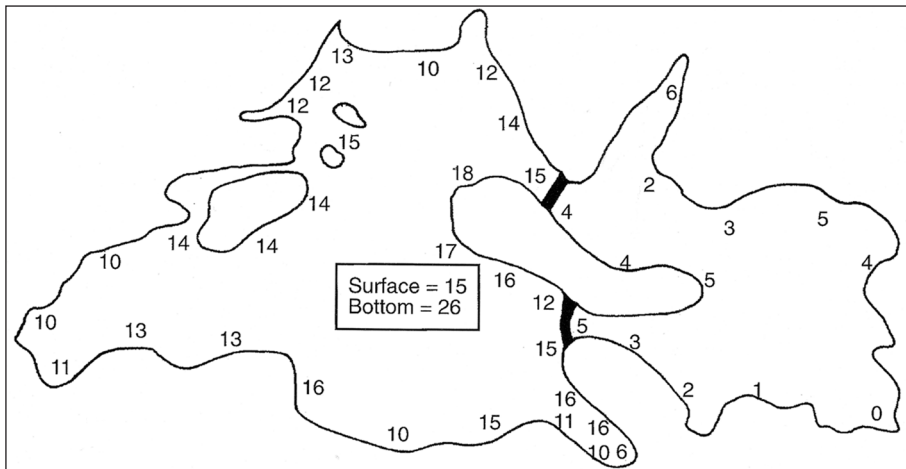


FIGURE 3: Salinities of the Fajã dos Cubres (after MORTON *et al.*, 1998).

turn, is fringed internally by a wide-geon-grass, *Ruppia maritima* L. bed. This is the only locality in the Açores Archipelago where this sea-grass occurs (MORTON *et al.*, 1998a).

Fajã dos Cubres is currently classified as a Site of International Importance under the Ramsar Convention relative to the List of Wetlands of International Importance, and was designated on 2 December 2005, especially with regard to protection of its habitat for aquatic birds.

### ***Fajã de Santo Cristo, São Jorge***

The Special Ecological Area of the Fajã de Santo Cristo sits on the north shore of São Jorge and has a total area of only 0.86 km<sup>2</sup> (length,

500 metres; width, 250 metres) and a maximum depth of six metres (MORTON, 1967). The lagoon itself sits behind a boulder rampart through which is a channel that was (and still is) maintained. That is, it is kept open by local villagers. An early text by MONIZ (1906) discusses Santo Cristo and records that the lagoon there was full of shrimps (probably *Palaemon* sp.), which were caught and used by fisherman as a bait to fish for grouper, possibly the solitary dusky grouper, *Epinephelus marginatus* (Lowe, 1834), which PORTEIRO *et al.* (1998) considered to be one of the non-resident juvenile visitors to the lagoon.

When visited in 1965, MORTON (1967) made the first map of the lagoon (FIGURE 4) and, in addition

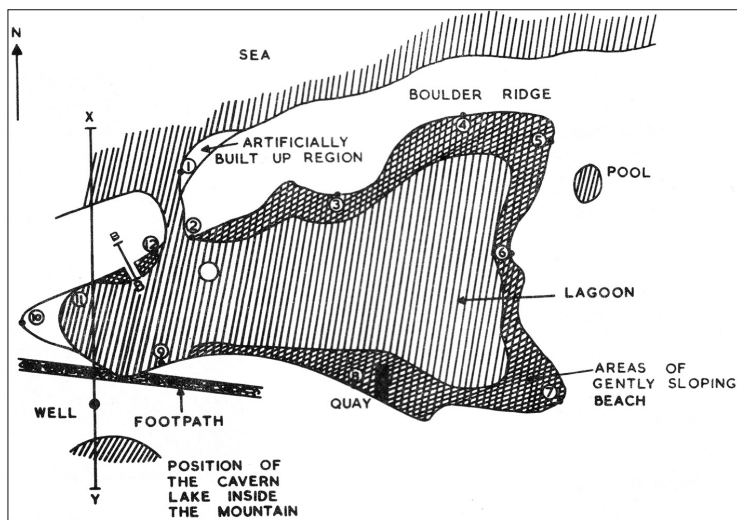


FIGURE 4: The first map of Fajã de Santo Cristo (after MORTON, 1967).

to determining that it had a landward freshwater source, also identified an area of the inlet that was clearly, then, man-made. A map of the lagoon was also created for the book *Ecologia Costeira dos Açores* (MORTON *et*

*al.*, 1998a) (Figure 5) and similarly sources of freshwater input detected (Figure 6).

Although the Fajã de Santo Cristo was first studied in 1965 (MORTON, 1967), subsequent, more-detailed,

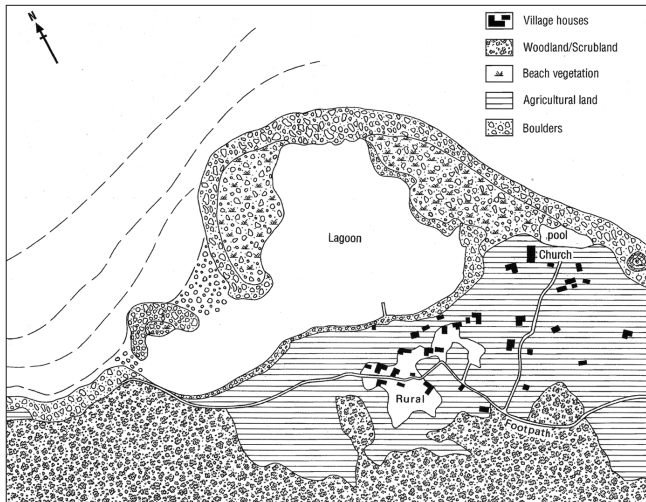


FIGURE 5: A map of Fajã de Santo Cristo (after MORTON *et al.*, 1998).

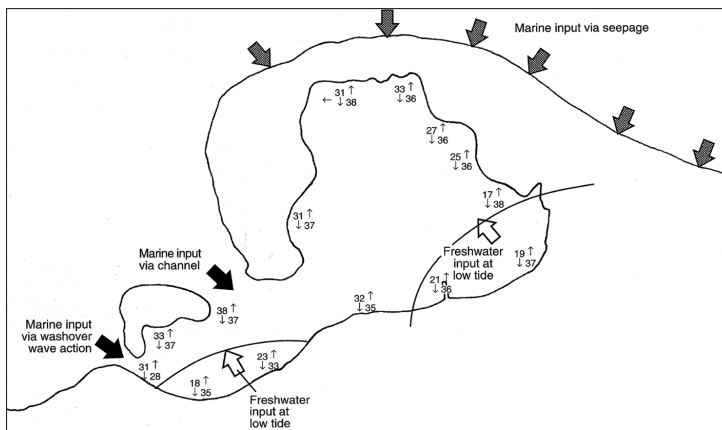


FIGURE 6: Salinities of the Fajã de Santo Cristo (after MORTON *et al.*, 1998).

studies were not undertaken until over 20 years later. These have been, for example, of the lagoon itself (MORTON & TRISTÃO DA CUNHA, 1993; FONSECA *et al.*, 1995) and of the introduced *amêijoas*, *Venerupis decussata* [as *Tapes decussata*] (Linnaeus, 1758), harvested from therein (SANTOS, 1985; SANTOS & MARTINS, 1987; SANTOS *et al.*, 1989; GONÇALVES & MARTINS, 1991; MORTON & TRISTÃO DA CUNHA, 1993, 2014). Occupied subsequent to the earthquake of 1757, the platform of Santo Cristo is towered over by the precipitous north face of São Jorge (FIGURE 7), its village comprising a church and a few houses and out-buildings. Communication with the



FIGURE 7: An arial view of Fajã de Santo Cristo (after JORGE & VALDEMAR, 1998).

São Jorge plateau above, to avoid the arduous climbs both up and down was achieved by steel hawsers that, top and bottom, could be wound down and up manually (FIGURE 8) carrying the necessities of life and village exports, respectively. Such windlasses (*cabrestantes*, locally) were still in operation in 1965.



FIGURE 8: Fajã de Santo Cristo. A windlass used to transport goods and chattels up and down the mountain behind the Santo Cristo platform. (after ÁVILA, 1992).

The lagoon of Fajã de Santo Cristo was initially protected as a Partial Nature Reserve (Decreto Legislativo Regional N° 4/84/A, 1984). Subsequently, it was designated as a Special Ecological Area (Decreto Legislativo

Regional N° 6/89/A, 1989). Fajã de Santo Cristo is also classified as a Site of International Importance under the Ramsar Convention relative to the List of Wetlands of International Importance, and was designated on 2 December 2005. MORTON & TRISTÃO DA CUNHA (1993), however, argued for a stricter conservation designation of the lagoon. SANTOS *et al.* (1994) similarly identified Santo Cristo as

being of conservation interest and agreed that the lagoon should be protected and conserved albeit still allowing artisanal exploitation of the resident *amêijoas*. In this context, this singularly unique and probably most important of all Açorean marine intertidal habitats should, however, as a subject matter of historical importance, be also managed for eco-tourism.

## DISCUSSION

The European Union's member states, between them, govern probably more than 100,000 kilometres of coastline. On such continental margins, coastal lagoons are, or at least used to be, common, occurring along nearly 15% of the world's shorelines and mainland Europe was especially rich in them. Today, however over 75% of humankind lives on the coast and the threats to delicate marine habitats, especially lagoons, are growing. Coastal lagoons usually form along gently-sloping coasts and, typically, do not form along either steep or rocky coasts. In this sense, therefore, the Açorean lagoonal wetlands are of especial importance and interest occurring, as they do, in the case of São Jorge especially, behind large boulder rampart barriers.

The environmental conditions of lagoons are inherently variable, both spatially and temporally, and in the historical short and geological long terms. Such variations are unique to lagoons and reflect, in part, their formation, evolution and loss, latterly often through neglect and development. The inherent variability of lagoons imparts environmental stresses upon what are highly specialised ecosystems, resulting in the development of unique lagoonal communities of plants and animals. Perhaps owing to their geographic isolation too, similar habitat regimes can be encountered but the communities present in them are rarely predictable, and the species present show stochastic variations in terms of recruitment, occurrence and relative significance.



These specialist lagoon species are thus restricted to extremely narrow niches along narrow stretches of the coastline and, as the lagoons themselves evolve and change, so do their resident communities.

The processes of recruitment to lagoons are virtually unstudied. As a consequence, the suite of species present in any given lagoon is, itself, not just variable but also unique. More so, because every study of it is but a snapshot of its changing whole and, even given, as with the situations of Fajã dos Cubres and Fajã de Santo Cristo, which formed as a consequence of the same São Jorge earthquake, as has been described, both lagoons are intrinsically different both physically and biologically (MORTON & TRISTÃO DA CUNHA, 1993; MORTON *et al.*, 1995, 1998a). Strangely, the species that are lagoon inhabitants are more tolerant of environmental stressors than other communities, for example, exposed sand beaches. This is because of the intrinsically highly variable environment they have adapted to and evolved in. In some ways, however, the Açorean lagoon system is a microcosm of what has happened to them worldwide as a consequence of human interventions. The best example of this is the draining and reclamation of Belo Jardim at Cabo da Praia on Terceira described above. To protect such delicate wet-

lands, the Convention on Wetlands (Ramsar, Iran 1971), thereafter called the Ramsar Convention, is an inter-governmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for their wise and sustainable use. The remnant marsh at Paúl, at Cabo da Praia on Terceira, was designated a Ramsar Site in 2012 as had been Fajã dos Cubres and Fajã de Santo Cristo in 2005. It is herein concluded, however, that this level of protection is neither strong enough nor sufficiently appropriate to protect the sister *fajãs* of Cubres and Santo Cristo on São Jorge. I, therefore, recommend that these two locations be designated as World Heritage Sites, as follows.

In view, therefore, of the also unique origin, geology, ecology and fauna and flora of Fajã de Santo Cristo, the locality should maintain the status of a Site of Special Scientific Interest (MORTON & TRISTÃO DA CUNHA, 1993) although decrees by the Açorean Regional Government have been published recently which strengthen protection of Fajã de Santo Cristo and Fajã dos Cubres (see below).

The ecosystem provided by the lagoon of Santo Cristo and the exploitation of *Venerupis decussata* within it are protected under the legal

framework of Regional Decree Law N° 10/2011/A. This legal document established the Natural Park of São Jorge and reclassified and incorporated the Natural Partial Reserve of Lagoa da Caldeira de Santo Cristo (previously classified by the Regional Decree Law N° 14/84/A) and the Special Ecological Area of the Lagoa da Caldeira da Fajã de Santo Cristo (previously classified by the Regional Decree Law n.º 6/89/A) into the current Protected Landscape Area of the North Fajãs. This protected landscape also includes the Ramsar site N° 1615 (Lagoas das Fajãs da Caldeira e dos Cubres), under the Ramsar Convention, the aims of the Zona Especial de Conservação da Costa NE, under Rede Natura 2000, and the São Jorge POOC (Plano de Ordenamento da Orla Costeira da ilha de São Jorge) established by Regional Normative Decree N° 24/2005/A.

### **The World Heritage List**

Today, in 2013, The World Heritage List includes 981 properties forming part of the cultural and natural heritage which the World Heritage Committee considers as having outstanding universal value. These include 759 cultural, 193 natural and 29 mixed properties in 160 States Parties. As of September 2012, 190 States Parties have ratified the World Heritage Con-

vention. There are only two World Heritage Sites in the Açores, plus two tentative sites, as follows

1. The 15<sup>th</sup> century central zone of the town of Angra do Heroísmo in Terceira (designated, 1983).
2. The 15<sup>th</sup> century vineyard landscape and culture of Pico (designated, 2004).
3. Algar do Carvão, Terceira (tentative, 1996).
4. Furna do Enxofre, Graciosa (tentative, 1996).

This author and paper proposes that application be made for the Fajã dos Cubres and Fajã de Santo Cristo, São Jorge, to be designated as World Heritage Sites by the Autonomous Regional Government of the Açores and, in advocatorial practice by the office of the Island Governor of São Jorge.

### **The Criteria for Selection**

To be included on the World Heritage List, sites must be of outstanding universal value and meet at least one out of ten selection criteria. These criteria are explained in the Operational Guidelines for the Implementation of the World Heritage Convention which, besides the text of the Convention, is the main working tool for World Heritage Site designation. The



criteria are regularly revised by the Committee to reflect the evolution of the World Heritage concept itself. Until the end of 2004, World Heritage sites were selected on the basis of six cultural and four natural criteria. With the adoption of the revised Operational Guidelines for the Implementation of the World Heritage Convention in 2012, only one set of ten criteria exists.

Of the present ten World Heritage Convention Selection Criteria, it is suggested that the following are the most important with regard to the designation of Fajã dos Cubres and Fajã de Santo Cristo, São Jorge, Açores, as World Heritage Sites. (v), To be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change. (vii), To contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance. (viii), To be outstanding examples representing major stages

of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features. (ix), To be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals. (x), To contain the most important and significant natural habitats for *in-situ* conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of [*either*] science or conservation [*or both*].

In addition, the protection, management, authenticity and integrity of properties are also important considerations and, since 1992, also significant in the selection criteria are interactions between people and the natural environment which have been recognised as cultural landscapes. There is no question that this interaction applies to both Fajã dos Cubres and Fajã de Santo Cristo.

## CONCLUSIONS

The results obtained from research extending over many decades allow for the interpretation of biodiversity

changes, improve the ways in which biodiversity is measured and help us understand ecosystems and the ser-

vices, facilities and uses they provide. They can also reveal the ways in which regulation and management policies influence change allowing, thereby, for such changes to reciprocally influence regulations and management policies. In this context, studies undertaken and extending over the last fifty years and reviewed herein conclude that: (i), Lajes do Pico, Pico, should be designated for school ecology teaching and cultural eco-tourism; (ii), Paúl and the quarry at Cabo da Praia, Terceira, should be designated for bird watching eco-tourism and scientific colonisation monitoring since the latter has an accurately definable age; (iii), Fajã

dos Cubres and Fajã de Santo Cristo, São Jorge, should be designated as World Heritage Sites under the World Heritage Convention.

In addition, the Açores Autonomous Regional Government should also submit projects to the European Parliament in relation to the two São Jorge *fajãs*, and which interlink with scientific lagoon networks elsewhere such that programmes of sustained research can be conducted in order to manage the two lagoons and their surrounding land- and sea-scapes effectively for the benefit of present and future generations and the wider world community.

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