

THE AZORES, PORTUGAL

Identification and Profiling of
Surf Ecosystems for Inclusion in
Azorean Marine Protected Areas



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EXECUTIVE SUMMARY

The Autonomous Region of the Azores is at an important moment in the long term protection of its coastal ecosystems. The government along with key partners are considering a new strategy and process for Marine Spatial Planning in order to ensure the sustainable and equitable use of offshore marine habitats as well as the coastal ecosystems. These processes can safeguard marine resources and provide important protections for coastal ecosystems that are vulnerable to a myriad of threats. Incorporating surf breaks and surfing communities as stakeholders in the marine spatial planning process can yield immense benefits for conservation outcomes, the blue economy, and communities. To seize on these opportunities and legally protect surf ecosystems, Save The Waves created the Surf Protected Area Networks program which aims to legally protect critically important surf spots around the world where biodiversity and high quality surf overlap. The Regional Profile of the Azorean Archipelago is the first part of a six-step process which aims to protect critical surf ecosystems throughout the island chain. It gives a detailed description of the surf resources in the islands, provides critical information on biodiversity and the unique geography that creates surf ecosystems in the Azores, provides important information on the socio-economic aspects of surfing, and assesses the opportunities for conservation of surf spots within the context of ongoing Marine Spatial Planning processes.

The report concludes that there are key opportunities to integrate the protection of surf ecosystems in the Azores. While the island chain boasts many marine protected areas (MPA's) throughout its coastlines and exclusive economic zone, many of these areas are yet to adopt management plans and do not incorporate surfing resources as an important resource to protect. This is an enormous opportunity to include surfing resources and ecosystems in the enhancement of current MPA's, and the adoption of new protected areas.



INTRODUCTION

Coastal and marine environments provide essential ecosystem services that underlie the wellbeing of humanity (UNEP 2006). As an archipelago of 9 islands, the Azores are uniquely positioned to benefit “the wellbeing of humanity” from the continued provision of valuable ecosystem services that are also vulnerable to detrimental changes in the marine environment. Traditionally the Azores have relied upon the oceans for the provisioning of food through a significant fishing industry, critical revenue generation through a highly active marine tourism sector, and maritime transportation of people and material goods between islands. The marine environment also represents immense cultural value to the Azores in that the diverse communities on each island are bound together by a shared cultural patrimony embedded in maritime history. Looking to the future, sustainable development in the Azores will be contingent upon the region’s ability to steward the immense natural capital with which the islands have been endowed in the form of coastal and marine resources.

While the centrality of marine and coastal resources to the present and future prosperity of the Azores is clear, the integrity of these same resources is being compromised by human-driven changes to the environment. On a global scale, climate change, ocean acidification, sea level rise, and plastic pollution represent principal threats to coastal and marine ecosystems. Within the Azores, questions are emerging around the sustainability of current utilization of fishing resources with certain fish stocks in decline. Furthermore, impacts of coastal development and nutrient runoff on coastal ecosystems are becoming increasingly clear. With these external and internal threats to the marine environment causing irreversible damage to the stock of natural capital, the Azores are at an inflection point. There are prospects for expanding aquaculture, further developing the tourism industry, and pursuing other extractive industries that could impact coastal and marine environments. In pursuing these avenues for growth and development, increased emphasis must be placed upon fostering a blue economy that stewards and values the coastal and marine environment in order to uphold the wellbeing of current and future generations.

Embedding stewardship and protection within the management of marine resources is an immensely complex undertaking. The coastal and marine environments surrounding the Azores can be seen as a vast array of overlapping and interconnected social-ecological systems (Ostrom, 2007) embedded within many layers of institutions and governance. The extent to which management approaches can succeed in sustainably managing such complex and interconnected systems is in part determined by the engagement of stakeholder communities in the development and execution of programs and policies. Engaging communities has the potential to ground technical solutions in the dynamics and realities of resource users, thus bolstering the likelihood of implementation and realization of management strategies. The Azores consists of diverse islands and communities with distinct characteristics and identities. This diversity of community interests complicates the process through which diverse groups of stakeholders can have their needs and interests validated and upheld in the process of managing marine resources.



BACKGROUND ON SURF CONSERVATION

1.1 Surf Conservation

While there's no panacea for engaging and empowering stakeholder communities in marine resource planning and management, a compelling opportunity for progress exists in the productive alignment of surfing and conservation interests.

Surfing is a recreational activity of increasing global prominence that fosters intimate human interaction with the nearshore and marine environment (Reineman, 2016). The communities that form around surfing are deeply attuned to conditions and trends in the health of the nearshore environment and have a vested interest in stewarding the myriad natural systems that support surfing waves (Scheske et al., 2019). Therefore, the process of marine spatial planning and management in the Azores stands to benefit in a few key ways from the inclusion of surfing resources:

1. The environmental conditions favorable to surfing in many cases correlate to the ecosystem services that are undervalued, and therefore threatened by human activities (Scheske et al., 2019). Integrating surfing into the conservation process represents an opportunity to value and protect the multifarious coastal and marine ecosystems that underpin surfing resources.
2. Surfing is a critical source of social and economic value for coastal communities (Lazarow, 2008). Entrenching the protection and stewardship of surfing resources is an investment in natural capital that can yield significant and sustainable social and economic returns to the community.
3. Surfing communities are deeply rooted and have strong interests in sustaining healthy coastal and marine environments. This creates the potential for surfing to be a conduit through which the political will for coastal conservation is mobilized and expressed.

The next section of this report will provide an introduction to the sport of surfing and the burgeoning practice of surf conservation. Thereafter we will explore how the unique physical, biological, socioeconomic and community contexts in the Azores generate vast potential for bolstering the resilience of coastal and marine environments through the integration of surfing resources into coastal and marine management frameworks.



1.2 Surfing and Conservation Efforts

Surfing is a water sport in which participants ride an ocean wave standing on a surfboard, prone on a bodyboard or bodysurfing without any form of board. Other forms of surfing waves may include riding a stand up paddleboard, surf mat, as well as the emerging sport of hydrofoiling. The sport of surfing takes place at specific locations where local conditions such as bathymetry and the orientation of the coast to incoming swell shapes waves into a favorable form for riding. Surfing has become an immensely popular activity, with the estimated global population of surfers falling between 17 and 50 million people (Lazarow, 2008) and an associated multi-billion dollar global industry providing equipment, apparel, and surf tourism experiences (Scheske et al., 2019). The 2021 Olympics included surfing for the first time where millions of people around the world witnessed the sport on the global stage. Travel and exploration is a central part of surfing's culture, as demonstrated by international surf brands and surf media often focusing on the notion of 'the search' for perfect waves (Highton, 2014). As a result, surf tourism is among a small set of increasingly popular activities within the category of active nature tourism, and this is certainly the case for the archipelago of the Azores (Fundo de Maneio, Ponta Delgada, Portugal et al., 2018).

While other popular sports such as soccer or volleyball take place on near-perfect and consistent playing fields, surfing is unique for the dynamic and ever changing character of its field of play (Reineman 2016, pg. 144). The many interacting phenomena that contribute to a surf spot can be defined as a surf ecosystem, "the land to sea interface that creates the conditions for breaking, rideable waves and the flora and fauna and human communities that are dependent upon it." (Save The Waves Coalition, 2020). Surfers develop a deep connection and awareness of the coastal and marine environment through the practice of their sport (Reineman, 2016). This environmental awareness associated with surfing combined with the growth of the sport has contributed to the development of a global movement focused on stewarding and protecting surf breaks and their surrounding environments. This movement, often referred to as surf conservation, endeavors to leverage the economic, social, and cultural value of surf breaks in order to protect the various ecological and oceanographic processes upon which the quality waves depend (Atkin et al. 2019). Surf conservation represents a compelling opportunity for achieving conservation and economic co-benefits through deeply engaging surfing communities in managing the coastal and marine environment.

The viability of surfing at a given surf spot is contingent upon maintaining an intact seabed over which rideable waves break, and an open swell corridor through which swells can arrive. Both conditions align in many ways with conservation priorities in that local biodiversity also benefits from unaltered seabeds, the presence of wave action, and the diverse array of habitats these factors support. On a larger scale, many world class surf breaks overlap with critical biodiversity hotspots (Figure 1). While this overlap represents a pattern and not necessarily a rule, the location of surfing resources within priority conservation areas creates an immense opportunity for surf conservation to contribute to national and global goals in marine conservation, such as the Convention on Biological Diversity's Aichi Target 11 (Scheske et al., 2019) .



An additional research project called a Surf Conservation Index was created in conjunction with the writing of this Regional Profile in order to understand the overlap of surf breaks and areas of high biodiversity. This analysis goes into detail on where high quality surf breaks in the Azores overlap with areas of high biodiversity as well as other indicators to prioritize conservation efforts (Surf Conservation Index Azores 2021). This report includes important results that will aid the ongoing marine spatial planning processes by incorporating data on surf spots and considering surf resources in protection and management.

1.3 Surf Economies

In addition to conservation opportunities, there’s an emerging understanding that surfing is an immense contributor to local economies. This emerging body of research known as “surfonomics” attempts to estimate the direct and non-market values that the sport of surfing contributes to local economies. In a meta-analysis of economic valuation pertaining to surfing resources, Dr. Neil Lazarow at Australia’s Commonwealth Scientific and Industrial Research Organization documented the contribution of surfing to local economies ranging from hundreds of thousands to millions of US dollars (Lazarow, 2008). A macroeconomic study by two economists at Oxford estimated that, on aggregate, surfing contributes \$18-22 million (USD 2011) per surf spot to surrounding economies each year, or \$50 million globally (McGregor & Wills, 2016). In the most recent analysis, annual surf tourism expenditure globally was estimated at between \$31.5 to \$64.9



Figure 1: Global overlap between surfing and biodiversity hotspots (Scheske et al., 2019)



billion USD. In this same study, it was found that 92% of surfers are willing-to-pay more for sustainable tourism, highlighting the international demand for surf ecosystems that are biodiverse, have protection measures, and a sustainable tourism economy (Ponting et al. 2021). Complete valuations of natural assets, including the many associated non-market values are a complex and imperfect undertaking. Overall, it is clear that surfing can generate large amounts of socioeconomic value, though the sustainability of this value generation and the portion that accrues to the local community are critical factors to be monitored and proactively managed.

Though there has not been a specific surfonomics study in the Azores Autonomous Region, it is clear from several sources of data that surf tourism currently has and will continue to have an economic impact on the archipelago. A study in 2009 estimated that between 50,000 to 70,000 people surf regularly in Portugal and the number of surfers grows by 25% to 30% a year (Bicudo et al., 2009). This suggests a growing population of surfers who will likely travel to the Azores to practice the sport. The tourism agency of the Azores Autonomous Region known as “Visit Azores” promotes surfing as one of the main activities to do while visiting the country, displaying that the sport plays a key role in the tourism economy. As an example of their investment in surfing as a strategy for sustainable tourism, Visit Azores supported the majority of travel expenses and logistics for the Save The Waves Film Festival Azores which brought important films on surfing to 5 different islands and socialized the concept of Surf Protected Area Networks during the month of September 2021. A study on the economic potential for the surfing economy in the Azores could be a critical next step in ensuring the ongoing protection and management of coastal ecosystems.

1.4 Surfers as key stakeholders

Surf conservation also presents a compelling opportunity for engaging and empowering local communities in managing their surrounding coastal and marine environments. Surfers are increasingly being recognized as critical stakeholders in coastal management decision-making due to the wealth of local ecological knowledge possessed by surfing communities (Reineman, 2016). Surfers are also known to be effective at organizing direct action campaigns to protect coastlines, with many impactful campaigns and conservation organizations having been launched by surfers (Scheske et al., 2019). A wealth of innovative approaches has emerged for tapping and engaging surf communities in integrated coastal zone management (ICZM) with a central focus on managing social ecological systems (Ostrom et al., 2007). The complex dynamics of surf spots are best understood within the framework of social ecological systems, with resource units in the form of surfing waves existing with an expansive resource system utilized by overlapping bases of users all within multiple layers of governance (Arroyo et al., 2018). Managing such a complex system is facilitated by novel approaches to understanding environmental change and targeting responses to address complex multi cause-effect relationships (Arroyo et al., 2018). Furthermore, adaptive co-management approaches are relevant for tapping the local knowledge of surfers and other resource users in the development of indicators, feedback processes, and the integration of diverse stakeholders into the management process (Arroyo et al., 2020).



PHYSICAL AND BIOLOGICAL INFORMATION

While this Regional Profile will briefly cover important physical and biological aspects of the Azores as they relate to surf ecosystems, the Scientific Report to the Regional Government of the Azores entitled “Blue Azores The Best Kept Secret in the Atlantic” is a current review of the ecosystem dynamics in the islands and is an incredible source of information (Friedlander et al. 2019). Furthermore, while offshore biology and geography certainly have implications for coastal ecosystems, this report focuses on coastal dynamics as they relate to surf breaks.

2.1 Physical Structure and Oceanography

The Azores archipelago consists of nine volcanic islands located in the North Atlantic Ocean approximately 1300km west of Portugal. Individual islands in the archipelago are spread across 650km and are commonly broken out into the following groups:

- Western group: Corvo and Flores
- Central group: Faial, Graciosa, Pico, São Jorge, and Terceira
- Eastern group: Santa Maria and São Miguel

The Azores islands are located at the unique and geologically active intersection of the Eurasian, American and African continental plates. The high degree of tectonic activity at this junction produced the Azores islands as well as many surrounding deep-sea vents and seamounts. Rock formations characterize much of the littoral space surrounding the islands, with varying degrees of substratum stability and wave action influencing the composition of these zones and resulting habitats (Sustainable Fisheries Group, UC Santa Barbara, 2019 pg. 3).

In terms of oceanography, a complex system of currents is at play in the Azores including the confluence of cold water from the North Atlantic Current north of the islands, and warm water from the Azores Current in the south. The region’s ocean is nutrient deficient (Santos et al.,1995) but located at the subtropical/warm temperate ecotone boundary (Afonso et al., 2013) with strong oceanographic seasonal to decadal variability and episodic anomalies (Santos et al., 1995), rendering its marine biodiversity (resident and migratory) unique in the north Atlantic (pg. 23). Average sea surface temperature ranges from 15°C in the winter to 27°C in the summer (Martins et al., 2007). These and other strong oceanographic effects contribute to the unique environment of the Azores that supports a diverse array of endemic and migratory species.



2.2 Biodiversity and Ecosystems

The Scientific Report to the Regional Government of the Azores, which summarizes two research expeditions concluded that, “the waters around the Azores Archipelago contain some of the most important island, open water and deep-sea environments in the Atlantic” (Friedlander et al., pg. 3) The importance of these environments stems from the variety of topographical features and the confluence of distinct currents and water bodies, which support a diverse and unique assemblage of biodiversity (Sustainable Fisheries Group, UC Santa Barbara, 2019 pg. 2).

Based on the biological and geographical characteristics of the Azores, the archipelago is often grouped along with Cape Verde, the Canary Islands, Salvage Islands and Madeira as a Macaronesian archipelago. The Azores are located in the Palearctic ecozone and contain a unique biome with 420 endemic species at the time of writing (Borges et al., 2010). The distinctive set of geological features and oceanographic conditions present in the Azores supports habitats that are critical for various lifecycle stages of many species. A critical example is that of the dusky grouper, a marine ray-finned fish on the IUCN Red List that relies upon rock pools in the intertidal zone of islands in the Azores Archipelago as a nursery habitat for juveniles.

2.3 Ecosystem Services

Beyond supporting a wealth of biodiversity, the coastal and marine environment around the Azores generates critical ecosystem services that support the wellbeing of both local communities and society at large. Amongst these key services are:

1. The provisioning of food resources through fishing stocks that can be harnessed by the fishing community for human consumption.
2. Blue carbon sequestration is a process through which atmospheric CO₂ is sequestered in sediment layers on the seafloor, thus helping regulate the global carbon cycle being thrown out of balance by anthropogenic emissions (Sustainable Fisheries Group, UC Santa Barbara, 2019 pg. 30).
3. The productivity of marine biota supports fishing stocks that can generate a sustainable yield for fisheries.
4. Cultural value generated through the extensive maritime history and heritage of the Azores.



While it is clear that the biodiversity and physical components of the Azorean archipelago provide numerous ecosystem services, surfing can especially be considered of cultural and recreational value and an ecosystem service that can benefit both the locals and visitors who practice the sport. Various studies have shown that spending time close to the coast enhances physical and mental health and wellbeing and the prevalence of surf spots in the Azores provides a significant ecosystem service in terms of recreation, health and cultural value.

2.4 Biodiversity and Surfing

Why is biodiversity relevant to the protection of surf breaks? Various surveys and profiles from surfers have shown that in general, surfers care about not only the practice of the sport, but the health of the ecosystem surrounding the wave. This highlights the fact that surfers can be a strong voice for protection of marine resources and biodiversity. In general, the same impacts that may damage biodiversity in an area will also affect surfers in the water. Poor water quality, coastal development, climate change impacts, plastic pollution and marine debris impact surfers enjoying the water as well as the flora and fauna that reside in the surf ecosystem.

As stated in the previous section on surf conservation, many high quality surf spots overlap with coastal ecosystems that have a high degree of biodiversity. The Surf Conservation Index Report on the Azores displays where these surf spots overlap with areas of high biodiversity. The nexus of high quality surf and biodiversity provides immense opportunities for coastal conservation as the mutual benefits of protecting ecosystems with public health and recreation come together and the plants, animals, people, and local businesses benefit from measures to protect the coastline and the life that resides in these surf zones.



SOCIO-ECONOMIC INFORMATION

Introduction

The Azores has a population of 245,766 inhabitants and the economy's overall GDP was reported at €3,731 million (Filipa, n.d.). Both population and economic output are divided unevenly between islands. Table 1 below shows that GDP is concentrated on the islands of São Miguel and Terceira which are also the first and second most populous islands with around 56% and 21% of the total population, respectively (Filipa, n.d.).

Santa Maria	São Miguel	Terceira	Graciosa	São Jorge	Pico	Faial	Flores	Corvo	TOTAL
2.80%	58.20%	21.50%	1.50%	3.30%	5.00%	6.20%	1.30%	0.20%	100%

Table 1: Distribution of Regional GDP by Island (Eurostat, 2015)

The primary sector in the Azorean economy is that of services, which includes administration, education, trade, transport, and tourism. The next most important sectors that also contribute largely to employment include agriculture, forestry, and fisheries. Services represent an important part of the economy including public administration. Wholesale and retail trade, transport, accommodation and food-related service activities rank next in importance (Table 2). The sectors of agriculture (with a strong focus on dairy farming) and fisheries are also very relevant for the economy of the Azores (Filipa n.d., pg. 3).

EMPLOYMENT BY ECONOMIC ACTIVITY	2015
Agriculture, forestry and fisheries	10.3
Industry (except construction)	9.5
Construction	6.6
Wholesale and retail trade, transport, accommodation and food-related service activities	25.7
Information and communication	No data
Financial and insurance activities	No data
Real estate activities	No data
Professional, scientific and technical activities; administrative and support service activities	4.9
Public administration, defence, education, health and social work	34.2
Arts, entertainment and recreation; other service activities; activities of domestic and extraterritorial organisations and bodies	9.8
Total	103.5

Table 2: Employment by Economic Activity (Eurostat, 2015)



Tourism, while not mentioned explicitly in the table, would fall within the service activity sector and holds special importance as an expanding area of growth and opportunity in the Azores (Fundo de Maneio, 2018 and Filipa, n.d.). Other countries such as Costa Rica, have focused on sustainable tourism and surfing as an economic growth strategy with good results. As a sustainable non-extractive activity, surfing represents an opportunity to harness the economic benefits of tourism.

3.1 Fisheries

Fisheries and fishing economies play an important and central role in the economy of the Azores. The important work of the Sustainable Fisheries Group of University of California Santa Barbara (UCSB) prepared in 2019 for the Blue Prosperity Coalition provides a framework for the economic valuation of revenue generating services such as commercial and artisanal fisheries. Their analysis estimated that fisheries including recreational, demersal, pelagic and coastal were worth 31.7 million euros in 2017 (Sustainable Fisheries Group, UC Santa Barbara, 2019). The same study also found that fisheries provided direct employment to over 1,500 fishermen in 2018 and additional jobs are provided through the processing industry, fish market circuit, and maritime and air transport sectors (40). The study also found that most fish landed in the Azores are sold fresh, with the exception of tuna, which is canned for export (Sustainable Fisheries Group, UC Santa Barbara, 2019).

The UCSB study describes recreational fishing as a growing sector of the economy in the Azores. The economic benefits come from expenditures on gear, fuel, bait, licenses and other items. The report estimates that there are 3,000 licensed spearfishers in the Azores and 1,400 boats licensed for recreational fishing (12).

3.2 Marine Tourism

The UCSB Sustainable Fisheries Group Study also highlights that marine tourism plays an essential role in revenue generating services and was estimated to be between 23.5 and 67 million euros. The study notes that tourism in the Azores has risen steadily over the past three decades with a distinctive uptick in recent years. Indeed, the Regional Government's operational plan of 2020 established a target to increase the number of annual tourist nights to 1.3-1.4 million by 2023 and already surpassed those objectives reaching 1.9 million tourist nights in 2016 and 2017. Even with the ongoing impacts of the COVID-19 pandemic into 2021, the Azores has shown resilience in their tourism industry. A recent report shows that from January to June 2021, there were 458,400 overnight stays which is 39.5% higher than the same recorded period in 2020 (Azores Regional Statistical Service).



CONSERVATION STATUS AND POTENTIAL FOR SURF ECOSYSTEMS

Background

The Azores has been recognized as a leader in marine conservation due to the region's successful establishment of marine protected areas (MPAs) both within and extending beyond the exclusive economic zone of the islands (Friedlander et al., 2019 pg. 3). The Azores pioneered the first recognized MPA under the high seas with OSPAR recognition of the "Rainbow" MPA protecting a deep sea vent. There are 52 active MPAs within the Azores, covering more than 100,000 square kilometers.

While the Azores is largely considered pristine and afforded good levels of protection, there is a perception among fishermen that many stocks and areas are facing exploitation (Friedlander et al., 2019 pg. 3). Furthermore, most of the protected areas still do not have management plans, are small, weakly regulated, and lack financial and human resources for effective management (Friedlander et al., 2019 pg. 3). While the Marine Spatial Planning efforts offshore tend to focus on the sustainable use of marine resources, coastal conservation focuses more on threats including coastal development, water quality and pollution.

One of the most significant recent conservation processes in the Azores took place from January 2018 through January 2020 during the Macronesian Maritime Spatial Planning process or MarSP. This project aligned with the European MSP Directive 2014/89/EU in a call for cross border cooperation between the three regions of Macronesia. This project intends to reinforce the Maritime Spatial Planning processes in the three EU Macronesian Archipelagos including the Azores, Madeira and Canary Islands. Three stakeholder engagement workshops were held in 2018, 2019 and 2020. The main outcomes from these processes resulted in the definition of vision, goals and future scenarios for Azores Marine Spatial Planning, analyses of impacts, activities, threats, conflicts and synergies, and validation of spatial distribution of each identified maritime sector as well as legal constraints and good practices (Pegorelli C. et al pg. 8).

On the heels of this stakeholder engagement process, an alliance has formed under the program name Blue Azores. Focused on the conservation and sustainable use of the Azorean Sea, the Blue Azores Program will contribute to protecting, promoting and valuing the rich marine resources of the archipelago. Blue Azores is the result of an international partnership between the Regional Government of the Azores, the Oceano Azul Foundation and the Waitt Institute, uniting in a single vision of a healthy Azorean Sea and a thriving ocean society. Blue Azores aims to create new avenues for the sustainable economic development of the archipelago, in direct cooperation with the program's stakeholders.



Blue Azores is based on the following main goals:

- Declare **15 % of the Azorean** Sea as new, fully protected marine reserves
- **Implement management plans** for the new marine reserves and for all existing marine protected areas
- Legally implement a **marine spatial plan**
- Improve **fisheries management**

While the process for implementing the vision of Blue Azores is in its initial stages at the time of writing, it represents the most significant step forward towards significant conservation gains in the archipelago in the future.

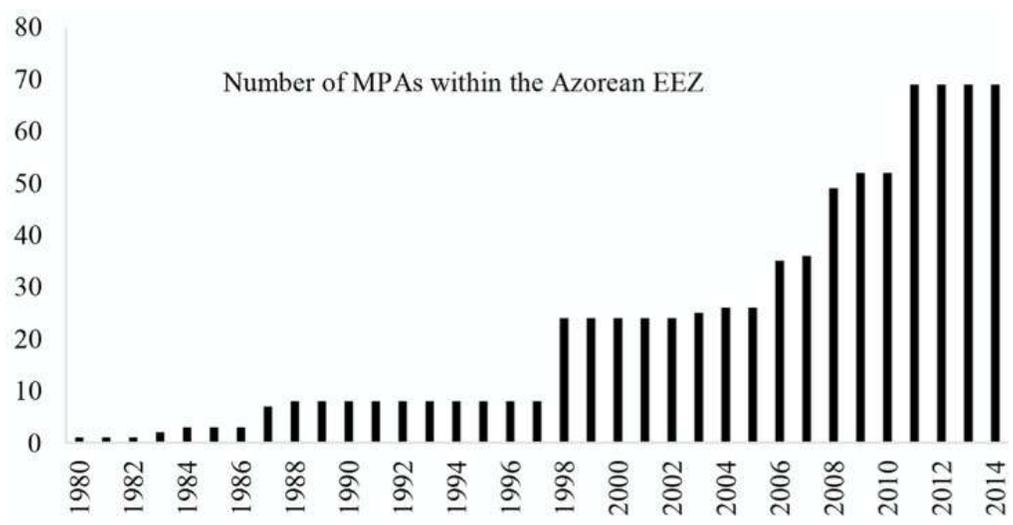


Figure 2: Number of MPAs within the Azores EEZ (Abecasis et al., 2015)

4.1 Surf Conservation Overview in the Azores:

In recent years and due to the development of a strong surfing community in the Azores, more focus has been placed on the protection of waves around the islands in order to ensure they are not lost to the various threats surf ecosystems around the world face. Organizations such as the Azores chapter of Surfrider Foundation Europe as well as the Portuguese organization Salvem o Surf (S.O.S) have engaged in various campaigns and projects to protect surf ecosystems across the islands.

Surfrider Foundation Azores has completed a technical study mapping important surf locations to be protected under the marine spatial planning process and documented many of the important surf breaks that exist across the islands (Surfrider Foundation Azores Chapter). Both Salvem o Surf and Surfrider Foundation Azores as well as other local groups were involved in a campaign to protect the world class



wave Rabo de Peixe from a breakwater project. Unfortunately, this campaign was not successful and the wave was lost to the construction of a breakwater highlighting the urgent need for the consideration of surf breaks in coastal conservation and marine spatial planning efforts (Save The Waves, 2021).

Globally, surf breaks and coastal-marine ecosystems are under threat, either from the global impacts of climate change, such as sea level rise, ocean acidification and ocean warming, or from the impacts of nearby human activities that cause habitat deterioration and reduce water quality, such as coastal development, sewage, marine debris, solid waste, oil spills, coastal erosion, and restricted access (Arroyo et al. 2020). Some of these pressures and impacts have occurred or are ongoing in the Azores. However, compared to many places in the world, the Azores is relatively sheltered from the pressure of more urbanized areas due to its remote location and relatively small population. Therefore, there is an incredible opportunity to protect these coastal ecosystems now while they remain relatively unexploited and healthy in the face of the escalating impacts of climate change and increasing levels of tourism and residency in the archipelago.

4.2 Surf Community in the Azores:

While surfing in Portugal has expanded significantly in the past twenty years, so too has the sport of surfing in the Azores. While there is no known research on the number of surfers in the archipelago, it is clear from discussions with visiting surfers from Portugal as well as local Azorean surfers that interest in the sport in recent years has grown significantly (Macedo, 2021). The Association of Bodyboard and Surf of the Azores submitted a World Surfing Reserve application in 2017 to Save The Waves displaying the interest of the surf community for recognition of the world class surf breaks as well as a desire for coastal protection (World Surfing Reserve Application Azores, 2017).

The surf community is largely based around Ponta Delgada and the island of Sao Miguel as there are a number of well known high quality surf breaks as well as it being the most populated region in the islands (Surf Conservation Index - Save The Waves 2021). The island of Terceira likely has the second largest surf community due to its population and prevalence of high quality waves.

Island	Number of surf schools	Number of surf shops	Number of surf hostels
São Miguel	4	7	5
Terceira	1	1	0
São Jorge	0	0	1

Table 3: Presence of Surf Schools, Shops and Hostels (Azores Surf Conservation Index, 2021)



4.3 Surf Resources Overview:

The Azores contain a multitude of different types of surf breaks. Reef breaks, point breaks and beach breaks can all be found across the 9 islands. Winter is the most productive period for swells and as an island archipelago, the Azores benefits from a 360 degree swell window. This means that wave frequency is high as the coastline is exposed to all swell and wind directions (Magic Seaweed).

The exploration and documentation of surfing locations within the Azores is still ongoing. Many areas of the coastline are inaccessible and there are likely many rideable waves for surfing that have yet to be discovered. Also, some surfing communities do not publicly discuss the location of all known waves in an effort to minimize crowding. For the purposes of this regional profile, we aggregated publicly available data on surf spots in the Azores through various surf travel and forecasting websites including Wannasurf, visit.azores.surf, and surf.forecast.com. We then validated this data and added additional sites based on the consultation of a local expert surfer. The data on these surf breaks is analyzed more thoroughly in the Surf Conservation Index that accompanies this Regional Profile, but will be presented in general terms here.

In our research 89 surf spots were identified in the Azores (Table 4). Certainly, there are more areas suitable for surfing on the islands, but these 89 spots represent known locations from available data. Most identified locations are on the larger, more populous islands including Sao Miguel and Terceira. The surf quality is reported to be high in much of the region as reported by local surfers, publicly available data, and surfing publications such as The Surfers Journal.

Island	Number of Surf Spots	Surf Quality (1-5)	Surf Frequency (1-5)	Count of Cluster
Terceira	13	5	4	4
Sao Miguel	40	5	5	16
Sao Jorge	9	5	5	5
Santa Maria	3	5	3	0
Pico	7	5	5	0
Graciosa	4	5	5	0
Flores	6	5	4	3
Faial	6	4	4	2
Corvo	1	0	0	0
Grand Total	89	5	5	30

Table 4. Overview of surf spots in the Azores



4.4 Surf Conservation Recommendations

As stated previously, there is immense opportunity to integrate Surf Protected Area Networks as a useful tool for coastal conservation in the Azores. As an area with incredibly high biodiversity, a unique and robust surf culture and community, as well as high quality surf, the protection of coastal ecosystems through the lens of surfing could yield significant benefits for nature and people on the islands.

Surf communities are typically not considered a significant stakeholder in Marine Spatial Planning processes and this is a missed opportunity. Surfers tend to be passionate about the sport and greatly value the natural beauty and physical and biological components that create surf ecosystems. While the results of the MarSP process play into future decision making at the government level and the Blue Azores program begins to take shape, there is immense opportunity to engage with surfers as stakeholders for coastal protection, utilize the Surf Conservation Index which has identified high priority surf ecosystems in the region, and integrate the surf economy into blue economy analyses for conservation.



SUMMARY ASSESSMENT

The Azores autonomous region is at a crossroads for the future of its economy and environment. The current process to create and implement management plans for the new and existing marine protected areas presents an opportunity to integrate the surfing community and surf ecosystems into these conservation efforts and build a network between the surfing communities and the Blue Azores program.

Historically, Azorean's livelihoods are strongly linked to the ocean, and surfing is now stimulating a new generation of fishermen and coastal enthusiasts to protect their waves. In islands such as Sao Miguel and Terceira, the surfing communities have fought coastal development projects that have destroyed their waves. These threats and losses highlight the importance of engaging the surf community in local decision-making processes. Surf protected Area Networks could be a practical approach for local communities in the Azores to promote ocean conservation and provide sustainable livelihoods. Academics, surfers, and decision-makers can provide irreplaceable knowledge to the process of conservation around surf ecosystems.

STW will continue to work with partners as well as engage with local stakeholders and communities. Creating protected areas around priority surf ecosystems presents a unique opportunity in the Azores to strengthen management plans for new and existing MPA.





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