Case Study 8: Ecosystem-based solutions to solve sectoral conflicts in the Azores

Draft version: November 2017

Authors

Hugh McDonald, Ecologic Institute

Ben Boteler, Ecologic Institute

Holger Gerdes, Ecologic Institute

Project coordination and editing provided by Ecologic Institute.

Manuscript completed in November 2017

This document is available on the Internet at:

Document title	Study 8: Ecosystem-based solutions to solve sectoral conflicts in the Azores
Work Package	WP9
Document Type	Deliverable
Date	November 2017
Document Status	Draft version

Acknowledgments & Disclaimer

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information. The views expressed in this publication are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

1   Introduction and background

Marine biodiversity is a key natural resource of the socio-ecological system centred around the Faial-Pico Channel, as it is in the Azores and the EU's Outermost Regions more generally. Local communities as well as visitors benefit from a broad range of ecosystem services, especially fish and recreation, delivered by the marine ecosystems within the archipelago. The Azorean network of Marine Protected Areas (MPAs), of which the Channel is one, have the specific role to support and protect the critical marine ecosystems and the services they provide. However, diverging interests between sectors such as fisheries and tourism place challenges upon policy-makers, administrators, and managers to understand and manage trade-offs.

The objective of this case study is to apply the AQUACROSS Assessment Framework (D3.2) approach to study the Faial-Pico Channel MPA. By doing so, the overarching aim is to understand how applying the Assessment Framework and therefore the concept of Ecosystem Based Management (EBM) can lead to new and alternative management approaches for the improved protection and preservation of aquatic biodiversity.

As part of the application of the AQUACROSS Assessment Framework in the Faial-Pico Channel, this case study is used to investigate how scientific and stakeholder knowledge can be utilised effectively to inform a participatory process as part of an ecosystem-based management approach to MPAs (link to Task 1.1). Scientific and local knowledge all play a crucial role in the process of designing, implementing and managing policies to protect marine ecosystems and their biodiversity. However, effectively communicating and utilising these diverse knowledge sources to inform policy is challenging. Often, relevant scientific knowledge does not reach the relevant audience, or is incomplete or misunderstood and as a consequence may not be fully taken up in the decision-making process or decisions may not be based on the best available scientific knowledge. At the same time, policy and decision-makers may fail to consider, incorporate, or reflect stakeholder knowledge and values.

In addition to testing the AQUACROSS Assessment Framework, this case study also aims to answer the following research questions: What processes or governance structures for an MPA can best enable ecosystem-based management? How can scientific research, including information on economic costs and benefits and their distribution among stakeholder groups, be utilised in a participatory process to help achieve effective and balanced MPA management? What tools are best suited to communicate such knowledge and information to a diverse group of policy makers and stakeholders?

1.1 Problem statement

Challenge

Despite increasing international, Azorean, and local protection for the richly biodiverse Faial-Pico Channel, biodiversity in the MPA continues to be lost, as indicated by falling population indices of target coastal species in the channel (Afonso et al. 2014). Numerous human activities at place in the Channel are placing

pressure on the ecosystem, especially fishing and swiftly increasing tourist numbers. Fishers and tourism operators (including diving operators), value the biodiversity hotspots within the Channel, but have different objectives for how they should be managed. Managing the Channel is complicated by multi-level and overlapping responsibilities, with policy development and enforcement split across the local-level Nature Park of Faial and Nature Park of Pico, and the Azores-level Regional Directorate for Sea Affairs, who must consider local, Azorean, Portuguese, and EU policy targets. Additionally, as evidenced by the policy process that resulted in the 2016 increase in fishing regulations in the channel (Ordinance no. 53/2016), stakeholders such as recreational fishers and tourism operators are not well integrated into policy development. Additionally, there is no formal MPA management plan for the Channel that clearly establishes targets, roles, timelines, monitoring, and enforcement.
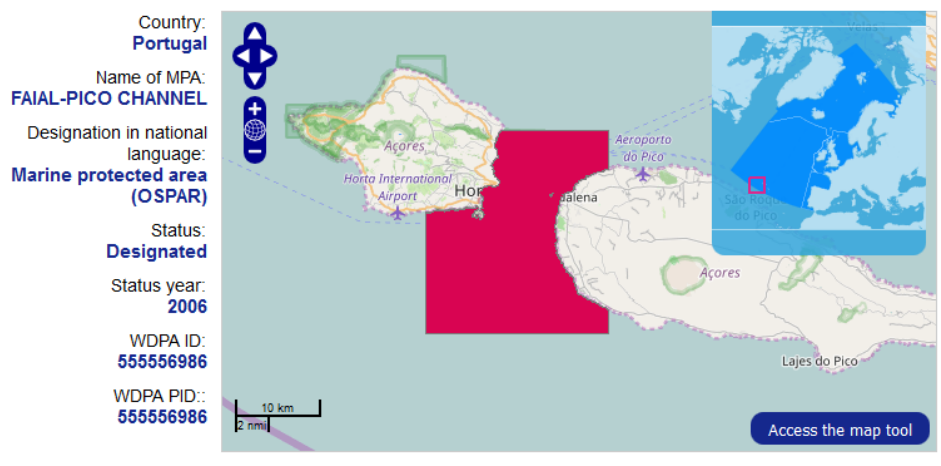

Figure 1: Faial-Pico Channel MPA (OSPAR Commission 2016)

Spatial characterisation

The case study centres on the Faial-Pico Channel MPA, a 240km² marine area situated between the Faial and Pico islands in the Azores. At its widest point, the channel separates the islands by 8km. The channel features a shallow shelf: the average depth at the channel's middle is 45m, relative to depths of 500m at its edge (MarBEF Data System 2006), see figure below.

The Faial-Pico Channel MPA is located in the middle of the Azores, an archipelago of nine volcanic islands located in the North-East Atlantic Ocean. The Azores are dispersed in three clusters over 600 km and positioned approximately 1500 km west of Portugal. They are an autonomous region of Portugal and one of the EU's Outermost Regions. The Azores are surrounded by considerable marine territories, with an Exclusive Economic Zone of 953,633 km2. However, due to the Azores having no continental shelf, only 2.2% of the EEZ is of an easily usable depth of less than 1000m (Ojamaa 2015).

As an Outermost Region, the Azores are required to enforce the European acquis communautaire, including all environmental directives. As an autonomous region of Portugal, the Azores have autonomous political and administrative status under the Portuguese Constitution. As such, it has its own regional government and parliament and is responsible for the administrative and political decisions in all sectors with exception of defence and foreign affairs (Benzaken and Renard 2011).

Ecosystem characterisation

Macaronesia (which consists of the Azores, Madeira, and the Canary Islands) is rich in biodiversity, with 5,728 endemic species (Madruga, Wallenstein, and Azevedo 2016), and valuable ecosystems that are recognised as of exceptional importance to locals, EU, and the world (Message from Reunion Island 2008). The Pico–Faial Channel MPA itself represents, "the most diverse and representative complex of habitats in the (Azores) archipelago" (MarBEF Data System 2006). Indeed, due to the "large number of species, habitats and ecological processes" at the site, it is one of the best examples of Macaronesian coastal ecosystems in the Azores (OSPAR Commission 2016). Hundreds of species of animals can be found in the MPA. This includes endangered cetaceans such as blue, sei, and minke whales, and common and bottlenose dolphins, endangered commercial fish such as bluefin tuna and the European eel, loggerhead and leatherback turtles, as well as many endemic fish, plants and invertebrates (OSPAR Commission 2016). Additionally, it hosts a number of endangered or threatened marine birds (MarBEF Data System 2006). The protected area features a number of distinctive habitats, including large shallow inlets and bays, reefs, and submerged or partially submerged caves and coral gardens (OSPAR Commission 2016).

Applying the linkage framework developed as part of the AQUACROSS Assessment Framework to the Faial–Pico Channel case study identifies 21 habitat types[1], as well as the four mobile biotic groups of fish & cephalopods, mammals, reptiles, and birds. The ecosystems within the Faial–Pico MPA provide a total of 20 ecosystem functions, including production, biogeochemical cycling, and mechanical or physical structuring, that in turn support more than 23 types of ecosystem services, including provisioning (e.g. fish), regulation and maintenance services (e.g. lifecycle maintenance, maintenance of water conditions), and cultural services (e.g. recreational interactions and existence value).

Socioeconomic characterization

Faial is 173 km² in size. The island has about 15,000 inhabitants and its main municipal seat is located in its largest city of Horta, on the east of the island. Pico, the larger island at 433km², has a similar sized population. Its largest city is Madalena, which lies across the strait from Horta, on the west side of Pico. The MPA area is used and valued by a number of stakeholders, especially commercial and recreational fishers, divers, and tourists (who swim, fish, snorkel, and dive in the area). The Channel is also crossed by ferries, and the islands are the base of whale and dolphin watching boats, among other users.

---

1 Using EUNIS level 3 definitions

Commercial and recreational fishing pressures are a significant threat to the Channel's biodiversity (Diogo and Pereira 2013). Fishing is of great social and traditional importance to the Faial-Pico Channel and the Azores Islands. However, the sector's share of employment in 2015, place fisheries sector employment (including fish processing) between 1500-3,151 people, equivalent to 1.5 -3.2% of the total employed population (Ojamaa 2015; Statistics Portugal 2017)[2]. The majority of commercial fishing in the Azores is artisanal; 85.5% of boats in the 767-strong fleet are under 12m, with large pelagic fish such as tuna and swordfish, and mackerel important species (STECF 2016). In 2015, total value of landed catch in the Azores was equal to €28 million, equivalent to 0.7% of Azorean Gross Value Added, which is approximately equal to the average nominal catch value of the last 20 years (1995-2015 average = €28.9 million[3]) (Statistics Portugal 2017). This is relatively high when compared to Portugal, where fishing and aquaculture contribute just 0.18% to national GDP[4] (Statistics Portugal 2017).

Recreational fishing is important to the local community in the Faial-Pico region and is also places pressure on the local biodiversity. In terms of annual catch around Faial and Pico (which includes the MPA area), the main recreational fishing activities in the Azores are recreational boat fishing (163t of fish per year), coastal rod fishing from shore (51t), spear fishing (6t), and hand collecting (Diogo and Pereira 2013). In total, the annual recreational catch around Faial and Pico is estimated to be 225t per year, equivalent to 49.5% of the annual commercial catch of the area (Diogo and Pereira 2013). At the 2015 mean value of landed fish for Azores (€3.43/kg)[5], this implies that recreational fish catch in the Faial-Pico Channel region is worth approx €780,000, and the local commercial fish catch a similar amount.

Alongside the ongoing fishing pressure, tourism visitors to the Azores and the Faial-Pico Channel – and their demand for use of the MPA areas – is complicating management. Tourism has grown increasingly important in the Azores over the last twenty years. For example, nights spent by tourists in the Azores increased from an annual total of approximately 400,000 as recently as 1995 to almost triple that in 2015, at 1,383,735 nights; in 2015, this equated to 444,140 visitors (at an average stay of 3.6 days) (SREA 2016). Due to the myriad sectors tourism money flows into, it is difficult to calculate total economic impacts. However, as one indicator of the importance, in 2015 total incomes for Azorean hotel establishments (from lodging, restaurants, etc.) were €54 million (a 21% increase on 2014; in 2016 this increased by an additional 30% to €70.7 million).[6] In Pico/ Faial, the total income to hotels and rural tourism accommodation was €8.9 million in 2016.[7] In 2015, this

2 Statistics Portugal: own calculations, Fishermen registered at 31 December 2015 in Azores

3 Statistics Portugal: own calculations, Nominal catch (€) by Landed port and Specie; Annual

4 Statistics Portugal: own calculations, Gross value added by industry, 2014.

5 Statistics Portugal: Mean value of fish landed (€/ kg) 2015

6 Statistics Portugal: own calculations, Total incomes (€) of hotel establishments by Geographic localization (NUTS - 2013); Monthly (2)

7 Statistics Azores (SREA): Own calculations, Receitas e Despesas das Unidades Hoteleiras da R.A.A., por Ilha

accommodation sector directly employed 2366 (2% of the total employed Azorean workforce), an increase of 25% on 2014.8

Coastal recreation activities are a major tourist attraction for the Azores. Important activities include sailing, boat tours, cruise tourism, hiking, whale and dolphin watching, sport fishing and scuba diving (Bentz et al. 2015; Calado et al. 2011). Whale and dolphin watching is limited within the MPA, but scuba diving and sport fishing is important and reliant on the same biodiversity hotspots that fishers value. Calculations suggest that revenue from scuba diving in the Channel is at least €1.2 – 1.5 million per year.9

Along with fishing and tourism/recreation, other human activities place pressure on the Faial–Pico ecosystem. Applying the AQUACROSS Linkage Framework that was developed as part of the AQUACROSS Assessment Framework identified a total of 26 activities (out of a possible 49 types), including residential and commercial development, environmental management (including dredging and coastal defences), services (including shipping), scientific research, and exogenous pressures related to climate change. These place a wide variety of types of pressures: out of the possible 39 pressures recognized by the AQUACROSS Linkage Framework, primary activities in the Faial–Pico Channel introduce 38 different types of pressures in some way. To differing weights and with differing impact on biodiversity and importance, these include introduction of pathogens, synthetic and non–synthetic compounds, extraction of flora and fauna, litter, changes in siltation, change of ecosystem structure/morphology, and noise, among others.

Policy characterisation

The Azorean Regional Government is responsible for the management of its marine resource usage and maritime activities under its own legislation. This legislation is aligned with, but not necessarily identical to, that of mainland Portugal (Abecasis et al. 2013). In terms of the MPA, governance is effectively split between three government institutions. Officially, as the MPA falls within 12 nautical miles of the two islands, the Faial Island Nature Park and the Pico Island Nature Park govern the MPA (along with all protected areas on the respective islands). However, the Regional Directorate for Sea Affairs (Direção Regional dos Assuntos do Mar, DRAM), which officially manages MPAs outside these territorial waters and has specific responsibility for conservation of marine species such as turtles and whales (Abecasis et al. 2015), has taken over policy development and implementation. The Island Nature Parks are cooperating with DRAM to monitor and enforce policy. These institutions have different abilities and objectives related to policy outcomes, monitoring, and enforcement. This complicates management, as the Island Nature Parks are historically more focused on and equipped (e.g. knowledgeable) to manage terrestrial biodiversity. Additionally, the authority senior to DRAM, the Regional Secretariat for the Sea, Science and Technology, is also responsible for fishing, which introduces additional management goals.

---

8 Eurostat: own calculations, SBS data by NUTS 2 regions and NACE Rev. 2 (2014-2016)

9 Personal communication, Enrico Villa (CW Azores); own calculations.

International, European, Portuguese, Azorean, and local policies all apply to the Faial–Pico Channel and its management may be further complicated by their diverse goals. At the EU level, overarching biodiversity goals are set by the EU Biodiversity Strategy to 2020, which aims to halt the loss of biodiversity and ecosystem services in the EU by 2020. This also includes specific targets for protection of marine areas and the attainment of the goals of the European Nature Directives: as three smaller areas within the Faial–Pico Channel MPA have been designated under the Habitats Directive as Natura 2000 sites, this also applies. The goals of these policies are aligned with the Marine Strategy Framework Directive and the Maritime Spatial Planning Directive. However, at the same time, other EU level policies such as the Common Fisheries Policy, which whilst aiming for environmentally sustainable fishing also promotes economic growth and fishing that can increase pressure on ecosystems (Rouillard et al. 2017).

This mix of goals and policies is also present at more local levels. The Azores' biodiversity strategy   is closely aligned (and reports in line with) the Portuguese Biodiversity Strategy, which in turn is aligned with the EU Biodiversity Strategy to 2020 and the Convention on Biological Diversity (Instituto da Conservação da Natureza e das Florestas 2015). The Faial–Pico Channel MPA is legislated through an Azorean-level Nature Park legislation, however, this is complicated by the governance overlap described in the previous paragraph. An indication of this overlap is that despite the fact that specific legislation created and consolidated the Island Nature Park conservation areas (including the Faial–Pico Channel), the most recent increase in biodiversity protections were introduced as fishing restrictions rather than under this policy. This mix of international, national, and local level policies, and their diverse policy goals, poses a potential challenge for the management of the Faial–Pico MPA.

Stakeholder characterisation

Due to the small spatial size of the Faial–Pico Channel and its relatively small neighbouring population of approx. 30,000, the number and type of stakeholders affecting and affected by the ecosystem are generally local and perhaps know each other on an informal level. Having said that, the transboundary nature of fish and the potential for people to visit and use the ecosystem, such as fishers from other islands, mean some other Azorean stakeholders should be considered. Key stakeholder groups include commercial and recreational fishers and related industry, tourism operators (such as diving operators and other tourism-dependent industry), tourists and recreationalists, scientists, civil society groups (such as local environmental NGOs), other users of the Channel such as the ferry operator Atlanticoline, as well as government ministries and Nature Parks, among others. While the commercial fishing industry has formal representative groups, there are no formal or informal representatives for recreational fishing and only ad hoc representation for tourism operators on the islands. This may be one reason why, despite local government attempts to include stakeholders in management discussions, the most recent participatory process (preceding Ordinance no. 53/2016) was limited in length and was missing key stakeholders from recreational fishing, tourism, and the wider society. Figure 2 provides an overview of key

stakeholders in the Faial-Pico Channel. It orders them by their level of interest in Faial-Pico Channel MPA management and their influence.
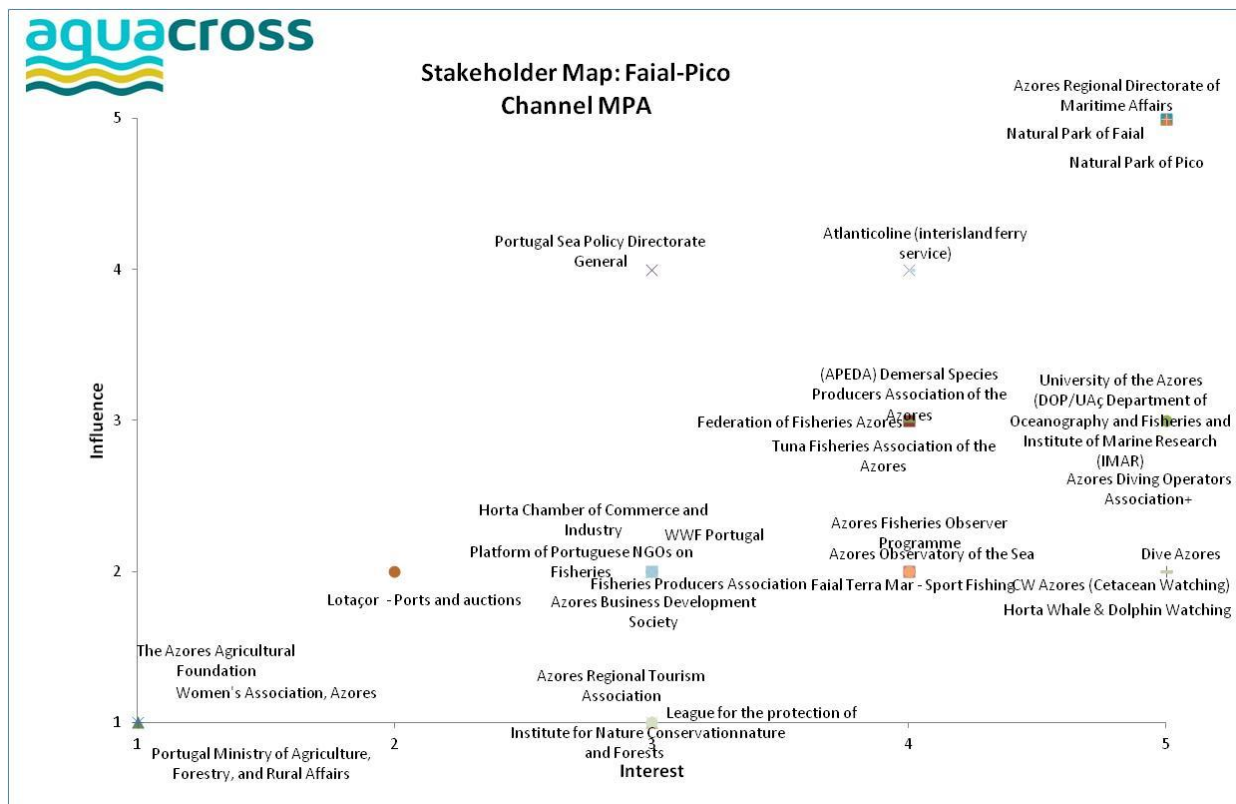

Figure 2: Stakeholder map of Faial-Pico Channel MPA

Overview of approaches

On the basis of a detailed stakeholder assessment to identify all key actors (including institutions, organisations, and individuals) that are relevant for MPA ecosystem-based management measures (see above), a series of stakeholder interviews (by phone) have been conducted to understand the current policy and management approach, use of information, and identify relevant ecological and socio-economic data on the Faial-Pico Channel MPA, including data on habitat quality, ecosystem services and associated economic costs and benefits (e.g. tradeoffs between beneficiaries). To provide stakeholders with insights into how the future delivery of ecosystem services might change under alternative management approaches and how this may impact local communities, different potential future scenarios based on existing research will be co-developed and validated with stakeholders. These scenarios will consider different management options and the impacts these have on socio-economic and ecological outcomes, with a particular focus on ecosystem services – and the inevitable tradeoffs between differing beneficiaries. The scenarios will consider management options, such as increased fishing restrictions and MPA alterations. They will also consider governance options, such as stakeholder management of the MPA and the creation of a formal MPA management plan, and the associated impacts these will have on compliance and the long-term

sustainability of the management options. Stakeholder based narratives (qualitative, semi-quantitative) will be used to assess management approaches against the baseline.

1.2 Solutions proposed (an introduction)

Stakeholders have proposed two main solutions to protect Faial-Pico Channel biodiversity and the sustainability of ecosystem services, whilst at the same time balancing the potentially competing demands of the tourism and fishing sectors. Both suggestions focus on the governance of the Channel. The first proposal is the establishment of a stakeholder working group to manage and monitor the MPA, with representation from all stakeholders. Stakeholders have also suggested a formalising Faial-Pico Channel MPA in the form of a MPA management plan. These solutions will address key issues of compliance, monitoring, incorporating stakeholder views, and integrating scientific and stakeholder knowledge into decision making. They also reflect stakeholders' recognition of shared reliance on the long-term sustainability of the local ecosystem, their interdependence, and their desire to cooperate to solve these solutions together. Changes in spatial fishing restrictions within the Faial-Pico Channel may also be considered, such as increased spatial restrictions.

2 References

Abecasis, Rita Costa, Nancy Longnecker, Luisa Schmidt, and Julian Clifton. 2013. 'Marine Conservation in Remote Small Island Settings: Factors Influencing Marine Protected Area Establishment in the Azores'. JMPO Marine Policy 40:1–9.

Afonso, P, M Schmiing, M Santos, H Diogo, and J Fontes. 2014. 'Áreas Marinhas Protegidas nos Parques Naturais de Ilha do Faial e do Pico, sector Canal: cenários iniciais.' IMAR – Universidade dos Açores, Horta.

Bentz, Julia, António Rodrigues, Philip Dearden, Helena Calado, and Fernando Lopes. 2015. 'Crowding in Marine Environments: Divers and Whale Watchers in the Azores'. Ocean & Coastal Management 109 (June):77–85. https://doi.org/10.1016/j.ocecoaman.2015.03.001.

Benzaken, Dominique, and Yves Renard. 2011. 'Future Directions for Biodiversity Action in Europe Overseas'.

Calado, H, K Ng, P Borges, F Alves, and L Sousa. 2011. 'Climate Change and Coastal Tourism in Azores Archipelago'. In Disappearing Destinations: Climate Change and the Future Challenges for Coastal Tourism, 296. UK and USA: CAB Intl.

Diogo, Hugo, and João G. Pereira. 2013. 'Recreational Boat Fishing Pressure on Fish Communities of the Shelf and Shelf Break of Faial and Pico Islands (Azores Archipelago): Implications for Coastal Resource Management'. Acta Ichthyologica Et Piscatoria 43 (4):267–76. https://doi.org/10.3750/AIP2013.43.4.02.

Instituto da Conservação da Natureza e das Florestas. 2015. 'Portugal – Fifth National Report to the Convention on Biodiversity'. https://www.cbd.int/doc/world/pt/pt-nr-05-pt.pdf.

Madruga, Luisa, Francisco Wallenstein, and José Manuel N. Azevedo. 2016. 'Regional Ecosystem Profile – Macaronesian Region'. BEST Ecosystem Profile. European Commission. http://ec.europa.eu/environment/nature/biodiversity/best/pdf/best-ecosystem_profile_macaronesia_2016.pdf.

MarBEF Data System. 2006. 'Faial-Pico Channel, Azores'. 2006. http://www.marbef.org/data/sitedetails.php?id=12909.

Message from Reunion Island. 2008. 'Message from the Conference "The European Union and Its Overseas Entities: Strategies to Counter Climate Change and Biodiversity Loss", Reunion Island, 7–11 July, 2008'. http://ec.europa.eu/environment/nature/biodiversity/best/pdf/message_from_reunion_island.pdf.

Ojamaa, Priit. 2015. 'Fisheries in Azores'. European Parliament. http://www.europarl.europa.eu/RegData/etudes/STUD/2015/540355/IPOL_STU(2015)540355_EN.pdf.

OSPAR Commission. 2016. 'Faial-Pico Channel – Marine Protected Area (OSPAR)'. OSPAR. 2016. http://mpa.ospar.org/accueil_ospar/fiches_didentite_des_amp/fiche_didentite_dune_amp?wdpaid=555556986&gid=1512&lg=0.

Rouillard, Josselin, Manuel Lago, Katrina Abhold, Lina Röschel, Terri Kafyeke, Verena Mattheiß, and Helen Klimmek. 2017. 'Protecting Aquatic Biodiversity in Europe: How Much Do EU Environmental Policies Support Ecosystem-Based Management?' Ambio, June, 1–10. https://doi.org/10.1007/s13280-017-0928-4.

Statistics Portugal. 2017. 'Statistics Portugal Website'. www.ine.pt/.

STECF. 2014. 'The Economic Performance of the EU Fish Processing Industry'. STECF-14-21. Luxembourg: Publications Office of the European Union.

———. 2016. The 2016 Annual Economic Report on the EU Fishing Fleet. https://stecf.jrc.ec.europa.eu/documents/43805/1481615/2016-07_STECF+16-11+-+AER+2016_JRC103591.pdf.

3   About AQUACROSS

Knowledge, Assessment, and Management for AQUAtic Biodiversity and Ecosystem Services aCROSS EU policies (AQUACROSS) aims to support EU efforts to protect aquatic biodiversity and ensure the provision of aquatic ecosystem services. Funded by Europe's Horizon 2020 research programme, AQUACROSS seeks to advance knowledge and application of ecosystem-based management (EBM) for aquatic ecosystems to support the timely achievement of the EU 2020 Biodiversity Strategy targets.

Aquatic ecosystems are rich in biodiversity and home to a diverse array of species and habitats, providing numerous economic and societal benefits to Europe. Many of these valuable ecosystems are at risk of being irreversibly damaged by human activities and pressures, including pollution, contamination, invasive species, overfishing and climate change. These pressures threaten the sustainability of these ecosystems, their provision of ecosystem services and ultimately human well-being.

AQUACROSS responds to pressing societal and economic needs, tackling policy challenges from an integrated perspective and adding value to the use of available knowledge. Through advancing science and knowledge; connecting science, policy and business; and supporting the achievement of EU and international biodiversity targets, AQUACROSS aims to improve ecosystem-based management of aquatic ecosystems across Europe.

The project consortium is made up of sixteen partners from across Europe and led by Ecologic Institute in Berlin, Germany.