

An aerial photograph of a coastal landscape. The top half of the image shows a steep, eroded cliff face with a yellowish-brown hue, featuring a winding path and some sparse vegetation. Below the cliff is a wide, sandy beach. The bottom half of the image shows the ocean with greenish water and white foam from breaking waves. The overall scene suggests a natural coastal environment under potential threat.

**GREENPEACE**

**DESTRUCTION**  
all along the coast

**Portrait of a Portuguese coast under threat**

**JULY 2026**



# **DESTRUCTION**

## **all along the coast**

**Portrait of a Portuguese coast  
under threat**

**JULY 2026**

Report produced  
by Greenpeace Portugal

Cover photo:  
Melides, Grândola (Setúbal)  
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A scenic view of Senhora da Rocha Beach, featuring a sandy beach, waves, and a large rock arch in the foreground.

# 01

## INTRODUCTION

*Senhora da Rocha Beach.*  
© Pedro Armestre / Greenpeace

Climate change represents one of the greatest environmental, social and economic challenges of our time, with particularly visible effects on coastal areas. **In the case of Portugal, its extensive coastline spans about 2,500 kilometers between the mainland, Madeira, and the Azores**, makes the country particularly vulnerable to the impacts of global warming. Rising sea levels, rising water temperatures, increasing frequency and intensity of extreme weather events, coastal erosion, and the loss of coastal and marine biodiversity are among the consequences already manifesting in several coastal regions of the country.

The socio-economic consequences are already clear: tourism, which accounts for 21% of the country's GDP, depends largely on the beaches, many of which are under threat or already experiencing a reduction in their sandy shores. Fishing is another sector in crisis, as illustrated by the case of one of its most iconic species: the sardine. Catches by the small-scale fishing fleet have decreased due to rising temperatures in the Atlantic<sup>1</sup>.

The winter of 2025 and the first quarter of 2026 confirmed the worst predictions made by climate models for the Portuguese coast. The coastline has faced not only a gradual rise in sea level but also a “stratification of impacts” caused by a series of explosive cyclogenesis events that have repeatedly struck the Iberian Peninsula.

This report analyses the main challenges facing each coastal region, from the northern mainland to the archipelagos, highlighting not only the risks but also the solutions to save these unique landscapes before it is too late. **The main conclusion is that unless urgent measures are taken — such as the restoration and adaptation of coastal areas or restrictions on coastal construction —Portugal could lose up to 10% of its habitable coastal territory in the coming decades<sup>2</sup>.**



**Níveis de água extremos das ondas (EWL) detalhados por célula sedimentar e sistema costeiro para a costa portuguesa. Veja a figura a cores na web.**

Source: <https://recyt.fecyt.es/index.php/geogaceta/article/view/98169/75203>

In addition to the impacts of climate change on the coast and landscape, the report also presents specific cases, notably in Greater Lisbon and the Setubal Peninsula, which illustrate how the lack of transposition or integration of protection standards into

<sup>1</sup> <https://www.ipma.pt/pt/publicacoes/pescas/>

<sup>2</sup> <https://apambiente.pt/clima/roteiro-nacional-para-adaptacao-2100>

**PORTUGAL HAS A COASTLINE  
OF APPROXIMATELY 2,500 km. IT IS THERE  
THAT MANY OF THE IMPACTS OF THE CLIMATE  
CRISIS ARE ALREADY BECOMING APPARENT**



municipal plans has enabled the prevalence of certain decisions restricting activities in protected areas. In this particular case, and given the sensitivity and fragility of the region, information obtained by the Dunas Livres Association, the Meco Livre Association and the “Reabrir a Galé” civic movement was taken into account for this report.

**The Portuguese coastline is not a line to be defended but rather a dynamic ecosystem that must be respected so it can continue to provide natural protection systems that shield us from the worst impacts of climate change, which are already evident.**

Without integrated management (natural protection, urban planning, and emissions reduction), the country may lose not only its landscapes **but also its economy and culture**. The authorities should consider permanent solutions to help preserve the coastline. If no action is taken, by 2050, we may see countless beaches reduced to a thing of the past.



**UP. Porto Moniz, Madeira Island.**

© Pedro Menezes / Greenpeace

**DOWN. Varadouro, Porto Santo Island.**

© Pedro Menezes / Greenpeace



Carvoeiro.  
© Pedro Armestre / Greenpeace

# 02

## METHODOLOGY AND SOURCES OF INFORMATION

*Porto Moniz Natural Pools.  
Madeira Island.*  
© Pedro Menezes / Greenpeace

The preparation of the report “**Destruction all along the coast - Portrait of Portuguese coast under threat**” is based on a multidisciplinary analysis that combines historical data analysis with real-time monitoring of the climate impacts recorded by the first half of 2026. The methodology is structured in four fundamental points:

### Analysis of official Portuguese government sources

A thorough analysis was carried out of the technical and cartographic documentation provided by the Portuguese institutions responsible for coastal and climate management:

- **Portuguese Environment Agency (APA):** access to coastal zone management plans and beach erosion monitoring reports.
- **Directorate-General of the Territorial Affairs (DGT):** analysis of land-use maps and compliance with the Coastal Zone Management Plans (POOC).
- **Portuguese Institute of the Sea and the Atmosphere (IPMA):** collection of historical meteorological data and records of temperature and wave anomalies during the winter of 2025–2026.
- **National Climate Change Adaptation Strategy (ENAAAC 2020-2030):** assessment of the extent to which the planned adaptation measures have been implemented.

### Review of international and scientific reports

To put the Portuguese situation into context within the global climate crisis, the following sources were consulted:

- **IPCC (Intergovernmental Panel on Climate Change):** Projections for rising sea level in different emission scenarios (SSP).
- **Copernicus Marine Service:** satellite data, updated through to 2026, on North Atlantic Sea surface temperature and the accelerating rise in sea level along the Iberian coast.

- **NASA and Central Climate:** coastal flood simulation models for the 2030 and 2050 scenarios, applied to the specific topography of the Tagus, Sado and Ria Formosa estuaries.

### Monitoring of European Union indicator

Taking into account the context of July 2026, the report includes an analysis of compliance with the following provisions:

- **The EU Nature Restoration Act**, which assesses Portugal’s progress in restoring coastal ecosystems and dunes.<sup>3</sup>
- Directives on flooding and risk management: a comparison of European objectives with the situation on the Portuguese coast.

### Media monitoring and emergency reports (2025-2026)

To understand the immediate impact of extreme phenomena, a study was carried out to analyse newspaper archives and to monitor the main national newspapers (*Público*, *Diário de Notícias*, *Expresso*) and local and regional media. This source proved crucial to:

- Document the structural damage caused by the storms in the first quarter of 2026.
- Collect reports from members of the public and residents regarding the loss of sandy areas.
- Identify planning disputes and new construction projects on the seafront that have arisen or progressed over the past year.

## Field work and geographic validation

The analysis is supplemented by visual validation using remote sensing tools to confirm the receding coastline at the ‘black spots’ identified in the North, Centre, Lisbon, Alentejo, and Algarve regions. To this end, a comparison is made between the situation before the winter of 2025 and that after May 2026.

## Other contributions

The contributions of the following parties were also essential to this report:

- Associação Meco Livre
- Associação Dunas Livres
- Movimento Reabrir a Galé

*Foz Club beach, Alvor.*

© Pedro Armestre / Greenpeace





An aerial photograph of a coastal landscape. In the foreground, there are large, undulating sand dunes with some sparse vegetation. A river or estuary winds through the middle ground, with sandy banks and patches of green marshland. In the upper right, a small boat is visible on the water. The sky is not visible, as the image is a close-up aerial shot.

# 03

## **CLIMATE CHANGE ON THE PORTUGUESE COAST**

*Fuseta.*

© Pedro Armestre / Greenpeace

**Portugal has become one of the epicentres of climate change in Europe, with visible effects ranging from unprecedented heat waves to the accelerated loss of its coastline.** Its geographical location, bordered by an increasingly warm and turbulent Atlantic, exposes it to unique risks that are already transforming landscapes, economies and ways of life.

Climate change acts as a **risk multiplier**, exacerbating existing vulnerabilities. According to the Portuguese Environment Agency (APA), more than 25% of the mainland coastline is receding, with losses of up to two metres a year in some areas. In addition, rising sea levels, which in Portugal are faster than the global average (3.7 mm/year versus 3.3 mm/year<sup>3</sup>), threaten to flood critical areas, including urban centres, wetlands and tourist areas.

Several factors make Portugal one of the European countries most exposed to this type of disaster:

- **Exposure to the North Atlantic:** Almost the entire coast is directly exposed to increasingly violent waves and extreme storms, such as Hurricane Leslie in 2018, which caused damage in Lisbon and the centre of the country or the winter of 2026, considered as **the worst example of coastal erosion caused by meteorological factors**<sup>4</sup>, due to an unprecedented succession of intense storms<sup>5</sup> that left insufficient time for the coast to regenerate between impacts.
- **A diverse geography and multiple risks of coastal erosion:** from the sandy beaches of the Algarve, which are constantly receding, to the cliffs of the Alentejo, which are crumbling due to erosion, and including the low-lying areas of Aveiro and the Tagus estuary, where the encroachment of the sea is already a daily reality.
- **Human impacts:** large-scale development on the beachfront, the overexploitation of aquifers and changes to river courses have exacerbated the coastline's vulnerability.
- **Temperature rise:** +1.5°C since 1970 (almost double the global average), with summer temperatures exceeding 45°C<sup>6</sup>45°C. Between 30 June and 2 July 2025, extreme peaks reached 46 °C.<sup>7</sup>
- **Less rain, but heavier:** average rainfall has fallen by 20% in the south, but episodes of torrential rain (such as those in Lisbon in 2023, with 100 mm in 3 hours) are more frequent.
- **Rising ocean temperatures:** Waters off the coast of Portugal have risen between 0.4°C and 1°C since 1980<sup>8</sup>, fuelling storms and altering marine ecosystems.
- **An increase in extreme meteorological events** (storms, heatwaves, etc.) of ever-greater intensity, causing accelerated chronic erosion and the permanent loss of sandy areas, as well as the collapse of protective infrastructure by hindering the natural cycle of sand enrichment.

**MORE THAN 25 % OF PORTUGAL'S MAINLAND COASTLINE IS RECEDING. IN SOME AREAS, THE LOSS AMOUNTS TO TWO METRES A YEAR**

Unfortunately, we are not talking about distant scientific projections, but about **a climate reality that is already transforming the Portuguese coast, with irreversible environmental, economic and social consequences.** Various data help to put into context the negative impacts already being felt as a result of climate change:

3 [https://sp.copernicus.org/articles/3-slre1/4/2024/?utm\\_source=chatgpt.com](https://sp.copernicus.org/articles/3-slre1/4/2024/?utm_source=chatgpt.com)

4 Programa SIARL. (Sistema de Informação de Administração da Região Litoral) <https://siarl.apambiente.pt/>

5 IPMA <https://www.ipma.pt/pt/publicacoes/boletins/climatologicos/>

6 <https://www.eltiempo.es/noticias/europa-es-el-continente-que-mas-rapido-se-calienta-del-mund-segun-el-informe-del-estado-del-clima-2022>

7 <https://cadenaser.com/nacional/2025/07/09/espana-y-portugal-batieron-records-de-calor-en-el-tercer-mes-de-junio-mas-calido-desde-que-hay-registros-en-el-planeta-cadena-ser/>

8 [pubmed.ncbi.nlm.nih.gov/climatechange/post.com](https://pubmed.ncbi.nlm.nih.gov/climatechange/post.com)

## Accelerated sea level rise

Portugal's Atlantic coast has seen a significantly higher sea level than the global average in recent decades. According to data from the Copernicus Marine Service's network of tide gauges and satellites, global mean sea level has risen by **approximately 3.3 mm/year since 1993**, while in the north-east Atlantic region — including Portugal — the rates are **between 2 and 4 mm/year**<sup>9</sup>. This regional acceleration exceeds global projections and particularly affects the Tejo and Sado estuarine systems.

Global warming has caused the oceans to expand and glaciers to melt at an unprecedented rate. The melting of Greenland glaciers is altering the Gulf Stream, reducing its protective effect on the Portuguese coast. In turn, thermal expansion accounts for 50% of the rise in sea level. In some specific points, such as the **Algarve coast**, the effect is 15% more intense than in the north due to ocean circulation patterns.

In Portugal, sea level rises by an average of 3.7 mm per year, a value higher than the global average (3.3 mm/year), according to data from the Portuguese Institute of the Sea and the Atmosphere (IPMA). If greenhouse gas emissions are not drastically reduced, it is estimated that by 2100 sea levels could rise by up to 1 metre, flooding critical areas of the country and destroying beaches, neighbourhoods and entire ecosystems. Areas that are in immediate danger have already been identified, such as the **Tagus estuary** (Lisbon), where 25% of its current area may be flooded, including neighbourhoods such as **Alcantara and Belém**, the natural park of **Ria Formosa** (Algarve), with 60% of its extension at risk, or the canals of Aveiro, which can disappear due to saline intrusion (salt water inlet), affecting very negatively not only biodiversity, but also agriculture.

**IN CASCAIS, SEA LEVEL ROSE  
BY AN AVERAGE OF 9.5 CM  
DURING THE 20TH CENTURY**



## Increase in extreme weather events

One of the impacts of climate change is an increase in extreme weather events (storms, cyclones, floods, heatwaves, major forest fires, etc.).

There is already data showing an unprecedented increase in the frequency of these extreme events.<sup>1</sup> **Since 2000, the number of storms with waves over ten metres high (considered extreme waves) has doubled.** The total energy of the storms affecting Portugal has increased by 65% since 1990. Storm Leslie, in 2018, was the first hurricane to hit the Iberian Peninsula in 184 years. On the other hand, winter storms last for 5-7 days, compared to a historical average of 2-3 days. At the same time, Portugal is experiencing new rainfall patterns, with events exceeding 100 mm in 24 hours now occurring 2.5 times more frequently.

<sup>9</sup> [https://climate.copernicus.eu/sea-level?utm\\_source=chatgpt.com](https://climate.copernicus.eu/sea-level?utm_source=chatgpt.com)



*Careanos Beach.*

© Pedro Armestre / Greenpeace

## WINTER 2025/2026:

**749 INCIDENTS, 571 CASES OF CRITICAL DAMAGE AND BEACHES THAT HAVE RECEDED BY 10 TO 20 METRES**

treat is between 10 and 20 meters, with some areas reaching 40 meters.

In the case of the **Azores** and **Madeira**, both archipelagos are experiencing a significant increase in the frequency of severe storms, resulting in repeated collapses of coastal infrastructure. In 2020, a severe storm hit Madeira, causing flooding and 48 deaths in Funchal. Two years later, floods caused by heavy rainfall, which reached 135 mm in just 2 hours, resulted in the deaths of eight people. In the Azores, hurricane frequency increased.

## Loss of biodiversity and coastal and marine ecosystems

Portuguese waters and coasts are home to a unique diversity of ecosystems and marine and coastal species. However, climate change is accelerating its degradation, with irreversible consequences for biodiversity and ecosystem services critical to the economy and human well-being.

The impacts of climate change are exacerbating coastal erosion and significantly affecting coastal estuaries and marshes. Portugal is rapidly losing its natural defences against climate change. Without dunes and marshes, the estimated cost of coastal defence engineering works is expected to exceed €50 million

Storm Elsa in 2023 generated waves 14 meters high in Nazaré, resulting in damage estimated at €300 million. In the same year, storm Helios destroyed 20 km of seafront promenades in the Algarve, resulting in losses estimated at €120 million.

The damage caused by bad weather between October 2025 and February 2026 (mainly due to explosive cyclones) led the Portuguese Government to mobilise €111 million to protect the coast.

In total, according to the Portuguese Environment Agency (APA), 749 incidents were identified along the coastline, along with 571 cases of critical damage<sup>10</sup>.

Copernicus (C3S) records reveal that the series of storms during the winter of 2025–2026 not only broke the record for cumulative erosion, leaving the coastline without any natural resilience. The average beach re-

<sup>10</sup> [https://apambiente.pt/sites/default/files/\\_A\\_APA/Comunicacao/Destaques/2026/SessaoApresentacaoOcorrenciasLitoral/relatorio\\_ocorrencias\\_apa\\_11\\_03\\_2026.pdf](https://apambiente.pt/sites/default/files/_A_APA/Comunicacao/Destaques/2026/SessaoApresentacaoOcorrenciasLitoral/relatorio_ocorrencias_apa_11_03_2026.pdf)

per year. In 2026 alone, this amount has already been doubled to €111 million.<sup>11</sup>

According to the Portuguese Environment Agency (APA), 50% of the dune systems are deteriorated or in retreat<sup>12</sup>. The main causes of this situation are coastal development and sand extraction for artificial feeding.

**50 % OF DUNE SYSTEMS  
ARE DETERIORATING OR RECEDING.  
WHEN THE DUNES DISAPPEAR,  
THE COAST LOSES ONE OF ITS MAIN  
NATURAL DEFENCES**



*Alagoa Beach, Porto Santo Island.*

© Pedro Menezes / Greenpeace

This year's storms have made visible the problem of the lack of sediment on the beaches. As most Portuguese rivers (the Douro, the Tagus and the Guadiana) are dammed, the amount of sand reaching the beaches is practically zero. The storms in early 2026 washed away sand that is not being replenished, accelerating the “**rockification**” of the coastline – that is, the process in which sand disappears and only rock or hard substrate remains.

There are already many known locations where coastal erosion has accelerated, notably **Costa Gala** (Figueira da Foz)<sup>13</sup>, where the coastline has receded by 270 metres, and **Faro beach**, where the beach has lost 25 metres in width since 1950 (University of the Algarve).<sup>14</sup>

The most complex cases of anthropic alteration are found in the **Ria de Aveiro**, where the abandonment of traditional salt-pan activity and agricultural/industrial expansion have fragmented and degraded marginal habitats since the 1980s<sup>15</sup>, and in the **Ria Formosa**, which has recorded a severe loss of its salt marshes due to the pressure of tourism urbanization and infrastructure expansion in recent decades<sup>16</sup>.

At the same time, *Zostera* grasslands have shrunk by 50% in recent decades.<sup>17</sup>

Numerous ecosystems at risk have already been identified, and we know what impact their disappearance will have:

- ***Zostera* seagrass beds of the Algarve and Arrábida.** Its extension has decreased since 1980 due to an increase in water temperature (+1,5 °C). Furthermore, ocean acidification slows down its growth. The disappearance of these submerged forests means the loss of breeding and rearing grounds for such important species as gilthead seabream and sea bass. Furthermore, they retain the sand on the beaches, preventing storms from washing it out to the seabed.

<sup>11</sup> <https://portugal.gov.pt/gc25/comunicacao/noticias/governo-avanca-com-pacote-de-investimento-para-recuperar-o-litoral-apos-tempestades>

<sup>12</sup> [https://apambiente.pt/sites/default/files/\\_SNIAMB\\_Agua/DLPC/POC/POC\\_C-E/Versao\\_Final\\_AnexoVI/5%20POC%20CE\\_RELATORIO%20AMBIENTAL.pdf](https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/5%20POC%20CE_RELATORIO%20AMBIENTAL.pdf)

<sup>13</sup> <https://rea.apambiente.pt/content/linha-de-costa-em-situa%C3%A7%C3%A3o-de-eros%C3%A3o>

<sup>14</sup> <https://outarquias.wordpress.com/wp-content/uploads/2019/04/paisaje-transfronterizo-red.pdf>

<sup>15</sup> <https://www.mdpi.com/2077-1312/9/2/234>

<sup>16</sup> [https://amal.pt/images/Plano\\_de\\_Cogest%C3%A3o\\_PNRF\\_para\\_consulta\\_1.pdf](https://amal.pt/images/Plano_de_Cogest%C3%A3o_PNRF_para_consulta_1.pdf)

<sup>17</sup> <https://www.publico.pt/2022/07/04/azul/noticia/restaurar-pradarias-marinhas-importante-conservar-restam-2011194>

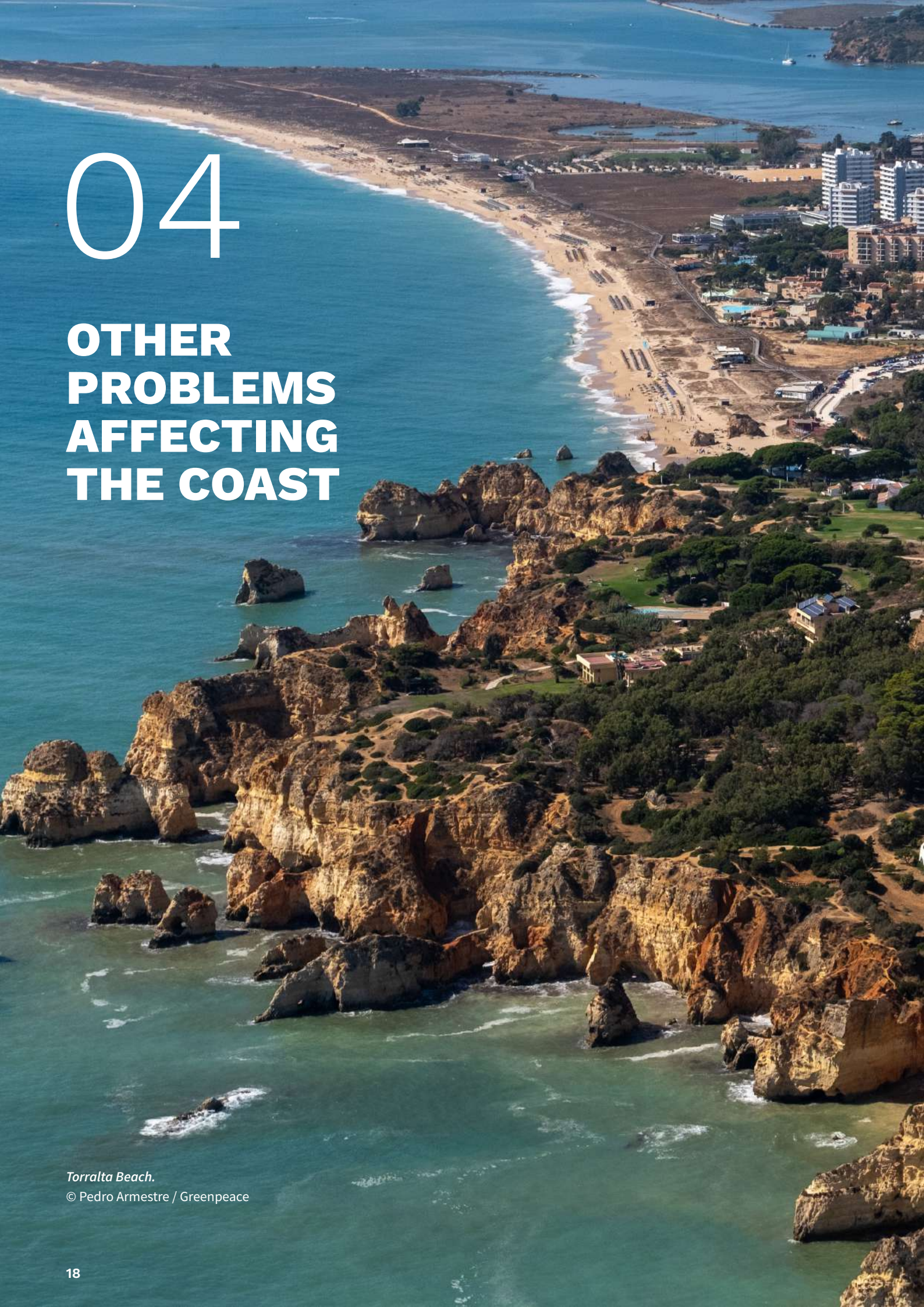


- **Salt Marshes and Estuaries in the Ria de Aveiro, Sado and Ria de Formosa.** Rising sea levels have caused saltwater to intrude, altering coastal wetlands. At the same time, storms – which have become more extreme and frequent – have destroyed 20–30% of halophilic vegetation (vegetation that can grow in soils or environments with high salinity, such as salt marshes, beaches or coastal areas) each year. As a consequence, the natural purification of water is reduced. Furthermore, the winter habitat of migratory species such as the flamingo disappears. These areas are vital for absorbing wave energy and preventing flooding.
- **Kelp forests in Berlengas and Peniche.** Their numbers have fallen by 70% in the last 50 years due to marine heatwaves and an overabundance of sea urchins, which no longer have any natural predators. As a side effect, octopus and lobster catches decreased by 25% due to the loss of their natural refuges.
- The population of **bluefin tuna** moved 200 km further north due to the increase in sea temperature.

*Feteira, São Miguel Island.*

© António Araújo / Greenpeace

- **Black coral banks (*Lophelia pertusa*) in the Azores** — unique in Europe — are in danger due to ocean acidification.
- The water in the Tagus estuary has three times as many episodes of low oxygen as in 1990. Low oxygen levels cause both death and stunted growth of aquatic fauna.
- The arrival of **invasive species**, such as the Asian seaweed (*Rugulopteryx okamurae*), which already covers 90% of the rocky seabed of the **Algarve**, or the blue crab (*Callinectes sapidus*), is driving away native species in **Sado**.

An aerial photograph of a coastal area. In the foreground, there are steep, rocky cliffs with some vegetation. The water is a deep blue-green. In the middle ground, there is a sandy beach with some buildings and a parking lot. In the background, there is a larger body of water with some boats and a distant shoreline.

# 04

## **OTHER PROBLEMS AFFECTING THE COAST**

*Torralta Beach.*

© Pedro Armestre / Greenpeace

Portugal resorted to **artificial nourishment of beaches as a palliative measure against coastal erosion, one of the serious problems it faces**. These measures mainly involve dumping sand extracted by dredging from the seabed or riverbeds and constructing breakwaters to retain the sediment. The severity of the erosion and the associated risk have meant that most of the investment made along the coast over the last decade and a half – totalling approximately €350<sup>18</sup> million has been earmarked for this type of measure.

In Madeira alone, artificial beach nourishment in Porto Santo absorbs 20% of the regional environmental budget<sup>19</sup>. This is an unsustainable cost, as these are merely temporary fixes—quite literally throwing money into the sea.

We must consider the negative impacts caused by artificial beach nourishment. On the one hand, there is damage to the marine ecosystems from which the sand is extracted, which also harms fish stocks. In the Algarve, sand dredging for beach nourishment destroyed 15 hectares of *Zostera* between 2015 and 2023<sup>20</sup> – the most important natural barrier beaches have against losing their sand. It also alters the natural rhythm of sedimentary dynamics. According to a study by the University of Lisbon, 60 per cent of beaches regenerated in this way require annual replenishment, as is the case with **Faro beach**.<sup>21</sup>

### 350 MILLION EUROS OVER 15 YEARS: ARTIFICIAL FEEDING BUYS TIME, BUT DOES NOT SOLVE THE PROBLEM OF SOIL EROSION



Coastal areas are subject to erosion. Source: APA, 2022<sup>22</sup>

<sup>18</sup> <https://rea.apambiente.pt/content/linha-de-costa-em-situa%C3%A7%C3%A3o-de-eros%C3%A3o>

<sup>19</sup> <https://www.madeira.gov.pt/>

<sup>20</sup> CCMAR-Algarve, 2023

<sup>21</sup> Universidade de Lisboa, 2022

<sup>22</sup> <https://rea.apambiente.pt/content/linha-de-costa-em-situa%C3%A7%C3%A3o-de-eros%C3%A3o>

The severity of the extreme events that occurred in early 2026 shows that artificial beach nourishment measures are very short-term and very costly solutions. **The coastline is no longer in balance.**

The danger of **desertification** is also a very worrying reality in Portuguese territory. In recent decades, this phenomenon has worsened due to increasing water scarcity, greater soil degradation and a reduction in vegetation cover. An academic study conducted between 2000 and 2020 in mainland Portugal shows a significant increase in the share of territory environmentally susceptible to desertification, from 58% to 74% over that period<sup>23</sup>. According to data from the EU Special Report No. 33/2018, more than 5.5 million hectares (over 50% of mainland Portugal) are at risk of desertification, with more than 30% of the territory classified as having high or very high vulnerability<sup>24</sup>.

**Beach litter** is also an unresolved issue. An analysis of the presence and composition of litter on the beaches of mainland Portugal, conducted between 2018 and 2020, revealed that 95% of the waste consists of artificial polymers, of which 44% are single-use plastics and 11% are marine debris. To meet the European Union limit – an average of 20 items per 100 metres – the country will need to reduce the total amount of litter on its beaches by 95%<sup>25</sup>.

*São Pedro de Moel.*

© Pedro Armestre / Greenpeace

<sup>23</sup> <https://doi.org/10.22541/au.164874063.30960873/v1>

<sup>24</sup> <https://www.eca.europa.eu/en/publications?did=48393>

<sup>25</sup> [https://apambiente.pt/sites/default/files/A\\_APA/Comunicacao/Destaques/2024/REA%202024/rea\\_2024\\_29\\_out.pdf](https://apambiente.pt/sites/default/files/A_APA/Comunicacao/Destaques/2024/REA%202024/rea_2024_29_out.pdf)





# 05

## **LEGAL FRAMEWORK FOR THE MANAGEMENT AND PROTECTION OF THE COAST**

*Torreira.*

© Pedro Armestre / Greenpeace

## Constitutional protection

The legal protection of the coastline is enshrined in the Constitution of the Portuguese Republic (CRP). Article 66.<sup>o</sup> of the CRP recognises the right of all to a healthy and ecologically balanced human life environment and imposes on the State the duty to defend it.

The protection of the coastline is a concrete manifestation of several constitutional principles: The right to the environment<sup>26</sup>; the protection of nature and biodiversity;<sup>27</sup> the preservation of natural resources, including water resources and coastal ecosystems<sup>28</sup>; land planning<sup>29</sup>; the prevention of erosion;<sup>30</sup> the prevention and reduction of natural and climate risks<sup>31</sup>; the protection of the safety of people and goods;<sup>32</sup> the safeguarding of the maritime public domain;<sup>33</sup> public access to the coast and beaches;<sup>34</sup> the promotion of the quality of life<sup>35</sup>; and the responsibility of the State to future generations.<sup>36</sup>

The right to the environment has a twofold dimension: a positive dimension, which requires the State to take action to protect the environment, prevent and control environmental damage; and a negative dimension, which imposes on the State and on all individuals the duty to refrain from practices that are harmful to the environment. In this respect, the right to the environment benefits from the enhanced constitutional protection afforded by the framework of rights, freedoms and guarantees: it is directly binding on public and private entities. It may be restricted by

law only to the extent necessary and without affecting its essential content.<sup>37</sup>

Applied to the coastline, this means that public or private decisions that unjustifiably, arbitrarily, and disproportionately exacerbate erosion, destroy coastal ecosystems, or increase the exposure of people and property to risk may undermine a constitutionally protected fundamental right.

## COASTAL PROTECTION IS ALSO A PUBLIC DUTY

### A fragmented legal framework

The legal framework governing Portugal's coastline is scattered across various pieces of legislation, planning instruments and sector-specific frameworks.

**The Framework Act on Climate**<sup>38</sup> frames climate policy, recognises the climate emergency and sets out the principles and objectives of climate action. Its relevance to the coastline stems from the link between climate adaptation, spatial planning and preventive risk management. The Act requires that risks such as coastal erosion, sea-level rise, storm surges, flooding and extreme weather events be taken into account in spatial planning instruments and urban planning decisions. Climate adaptation should therefore not be limited to general strategies: it must influence land classification and zoning, the definition of permitted

<sup>26</sup> Article 66(1) from CRP.

<sup>27</sup> Articles 9(e), 66(2)(c) from CRP.

<sup>28</sup> Articles 9(e), 66(2)(d) and 84(1)(a) from CRP.

<sup>29</sup> Articles 9(e) and 66(2)(b), from CRP.

<sup>30</sup> Article 66(2)(a) of the CRP.

<sup>31</sup> Articles 9(d) and (e) and 66(2)(a), (b), D) and f) of the CRP.

<sup>32</sup> Articles 9(d), 27(1), 62, No. 1, and No. 66, No. 1, of the CRP.

<sup>33</sup> Article 84(1)(a) of the CRP.

<sup>34</sup> Articles 9(d) and (e), 13, 66(1) and 84, paragraph 1(a) of the CRP. This aspect is primarily implemented through ordinary legislation relating to the public water and maritime domains.

<sup>35</sup> Articles 9(d), 66(1) and 81, (a) of the CRP.

<sup>36</sup> Article 66(2)(d) of the CRP, which expressly refers to the principle of solidarity between generations.

<sup>37</sup> The fact that the right to the environment is included in the catalogue of economic, social and cultural rights allows the legislator a certain degree of freedom in defining the content of that right, but never to the extent of undermining the constitutionally established minimum standard.

<sup>38</sup> [Law no. 98/2021, 31 December](#). Articles 1, 2, 3, 4, 5, 14, 17, 23 and 24 are particularly relevant.

or restricted land uses and, ultimately, planning permission in vulnerable coastal areas.

**The Water Act**<sup>39</sup> is the primary legislation governing water resources management. It expressly includes coastal waters and transitional waters (estuaries, tidal inlets and areas subject to tidal influence) within its scope. It is particularly relevant in four areas: the protection of coastal waters, the protection of water-dependent ecosystems, planning at the river basin district level, and the regulation of private uses of water resources. It also sets out environmental objectives: to prevent degradation, and to protect and improve the status of aquatic ecosystems and the terrestrial ecosystems and wetlands that depend on them (important for estuaries, marshlands, lagoon systems, coastal wetlands, tidal inlets and associated habitats). It forms the basis for the water resources utilisation regime: in practice, certain uses of water, riverbeds, riverbanks, or the public water domain cannot take place freely; they may be subject to authorisation, a licence, or a concession, as set out subsequently in the Water Resources Utilisation Regime.

**The Water Resources Ownership Act**<sup>40</sup> defines what falls within the public water domain, including the public maritime domain. It is particularly important because it prevents beaches, riverbeds, riverbanks, and coastal waters from being treated as extensions of private property or tourist developments. By subjecting these assets to a public domain regime, the law imposes conditions on occupation, construction, fencing, and economic exploitation. It imposes restrictions on access along the coastline. Consequently, any private use of these areas (for example, beach facilities, walkways, outdoor dining areas, tourist infrastructure, restricted access points or the occupation of riverbanks) requires a specific title and must respect the public interest, environmental protection, safety and public access to the coastline.

The **Water Resources Use Framework**<sup>41</sup> regulates the permits required for private use of water resources, including land occupation, infrastructure, beach facilities or other uses of the public water domain; in other words, it regulates when and how a person may make private use of water, riverbeds, riverbanks or other parts of the public water domain, including the public maritime domain.

**The Framework Law on Public Policy for Land Use, Spatial Planning and Urban Development** (<sup>42</sup>Framework Law on Land Use) establishes the foundations of public policy in these areas. It defines the legal framework through which land use must be planned, regulated and reconciled with environmental, landscape, climatic and safety considerations. The Act identifies the following as the objectives of land and spatial planning policy: combating the effects of erosion; increasing the territory's resilience to extreme weather events; preventing collective risks; curbing urban sprawl; and safeguarding and enhancing the coastal zone.

**The Legal Framework for Territorial Management Instruments** (RJIGT)<sup>43</sup> sets out how national, regional, inter-municipal and municipal instruments governing land use are coordinated. It is within this framework that special programmes fall, including the **Programas da Orla Costeira (POC)**, which are particularly relevant to the management and protection of the coastline. The POCs establish frameworks for safeguarding natural resources and values, identify risk areas, regulate uses, occupations, and activities in the coastal zone, and define actions that are permitted, subject to conditions, or prohibited.

The coastal shore framework<sup>44</sup> establishes that POCs<sup>45</sup> cover a terrestrial protection zone (ZTP), which, as a general rule, is 500 metres wide, measured inland from the edge of the seashore, and may be extended

39 [Law no. 58/2005, 29 December](#). Relevant articles: 1, 3, 4, 45 to 56, 58 to 62, 69, 73 and 90.

40 [Law no. 54/2005, 15 November](#). The Water Resources Ownership Act includes within the maritime public domain not only coastal and territorial waters, but also their beds and shores. The shore of the sea is, as a general rule, a strip 50 metres wide measured from the line marking the edge of the water's bed. Where there is a cliff, the measurement is taken from the crest of the cliff. Furthermore, where the shoreline consists of a beach extending for more than 50 metres, the shoreline extends as far as the land retains this character.

41 [Decree-Law no. 226-A/2007, 31 May](#).

42 [Law no. 31/2014, 30 May](#).

43 [Decree-Law no. 80/2015, 14 May](#).

44 [Decree-Law no. 159/2012, 24 July](#).

45 The POCs succeeded the former Coastal Zone Management Plans (POOC), which were Special Spatial Planning Plans (PEOT) under the responsibility of the central government and managed by the APA. Following the reform of the territorial management system in 2014/2015, the POOCs came to be classified as programmes. Some POOCs may still remain in force under the transitional arrangements, but are now classified as special programmes. This change is significant because programmes are directly binding on public bodies but, as a rule, do not directly and immediately bind private individuals; to that end, their provisions must be incorporated into the relevant municipal plans. However, it follows from the RJGIT that not all provisions of special programmes are devoid of direct effect in relation to private individuals and, therefore, not all need to be incorporated into territorial plans: only those which, from the perspective of safeguarding the values in question, establish permitted, restricted or prohibited activities relating to the occupation, use and transformation of land.

to 1,000 metres where justified to protect coastal biophysical systems. This strip is subject to particularly stringent regulations, under which the permissibility of land uses, developments and urban planning operations depends on the existing risks, the natural assets affected and the rules of the applicable scheme.

The RJGT is key to understanding the tension between coastal protection and urban development pressures. Although the POCs set out guidelines and protection standards for the coastline, it is the municipal plans (particularly the PDMs) that specifically regulate land occupation, use, and development and are directly binding on private individuals. Consequently, when coastal protection rules are not properly integrated, updated, or implemented in municipal plans, planning permission may be the point at which projects in sensitive areas are authorised.

The Framework Law on Land Use stipulates that the content of the POCs must be transposed into the applicable PDMs by 13 July 2021.<sup>46</sup> Once this deadline has passed, the POCs will remain in force but will no longer be directly and immediately binding on private individuals. If the municipalities fail to transpose the provisions by that deadline, the provisions of the plan that should have been amended will be suspended, and no acts or operations involving a change in land use in that area may take place (for the duration of the suspension).<sup>47</sup>

#### The **Legal Framework for Urban Development and Construction**<sup>48</sup>

sets out the rules that local councils must follow when assessing building works, land subdivisions and other urban development projects. It is this framework that determines when a planning permission is required, when prior notification is sufficient, how it is confirmed whether a building may be used, how to request advance information on the feasibility of a project, and what powers local authorities have to inspect illegal building works, halt construction or order the restoration of compliance with the law.

The RJUE assigns a decisive role to the municipalities. Still, the local council must verify that the project complies with the applicable spatial plans, administrative

easements, public utility restrictions and other legal and regulatory provisions. Thus, in vulnerable coastal areas, municipal licensing must comply with the POCs, the REN, the public water domain, nature conservation frameworks, risk areas and the applicable environmental conditions.

The **Legal Framework for the National Ecological Reserve**<sup>49</sup> protects areas of particular importance for ecological stability, the water cycle, the prevention of natural hazards and adaptation to the effects of climate change. It encompasses features directly linked to the coastline, such as beaches, coastal dunes and fossil dunes, cliffs and their respective protection zones, salt marshes, transitional waters and their respective beds and banks, and maritime and terrestrial coastal protection zones. In these areas, urban development and construction are not permitted without restriction: land uses and activities are limited, subject to conditions or prohibited, depending on their compatibility with the objectives of the REN.

The **Legal Framework for Nature Conservation and Biodiversity**<sup>50</sup> not only regulates nature conservation and biodiversity, but also organises the Fundamental Nature Conservation Network, including the National System of Classified Areas. Many sections of the Portuguese coastline coincide with protected areas or classified areas, where land occupation, construction, changes in land use, the creation of access routes, the installation of infrastructure or tourism development must be reconciled with the protection of habitats, species, dune ecosystems, wetlands, estuaries, cliffs and other natural assets.

The **Natura 2000 Network Framework**<sup>51</sup> is based on European Union law. It aims to protect natural habitats and species of fauna and flora of conservation interest by designating certain areas as Special Areas of Conservation (SACs) under the Habitats Directive and Special Protection Areas (SPAs) under the Birds Directive. When a coastal area forms part of the Natura 2000 network, tourism, property development or infrastructure projects that may affect it must not be assessed solely in the light of the Municipal Master Plan (PDM) or the municipal town planning framework: they must also be assessed in relation to the area's conservation

<sup>46</sup> This deadline has been postponed several times, and the latest update stipulates that the deadline is extended until 31 December 2024.

<sup>47</sup> See Articles 78 and 46, paragraph 5 of the [Framework Law of Land Use](#).

<sup>48</sup> [Decree-Law No. 555/99 of 16 December](#).

<sup>49</sup> [Decree-Law No. 166/2008 of 22 August](#). The specific boundaries of the REN must be checked against the REN Charter in force for each municipality.

<sup>50</sup> [Decree-Law No. 142/2008 of 24 July](#).

<sup>51</sup> [Decree-Law No. 140/99 of 24 April](#).

objectives. They may be subject to conditions, amended or prevented, where they jeopardise protected habitats or species.<sup>52</sup>

The **Legal Framework for Environmental Impact Assessment (AIA)**<sup>53</sup> sets out the rules governing the preliminary assessment of the environmental effects of certain projects likely to have significant impacts. Given that many projects may affect environmentally sensitive areas (beaches, dunes, cliffs, estuaries, marshes, coastal lagoons, protected areas or areas forming part of the Natura 2000 network), the EIA enables these impacts to be assessed before a final decision is taken, taking into account alternatives, mitigation measures, compensation and monitoring. It serves as an essential tool for halting, modifying or imposing conditions on projects that exacerbate erosion, destroy coastal habitats, increase risk exposure or undermine conservation and climate adaptation objectives.

The **Strategic Environmental Assessment (SEA) framework**<sup>54</sup> sets out when land-use and urban planning instruments must undergo an environmental assessment. Along the coastline, this is important

because it requires consideration, before the approval of such instruments, of the significant environmental effects of options that may encourage construction in sensitive areas, exacerbate coastal risks or compromise ecosystems such as dunes, salt marshes, cliffs and estuaries.

The AAE is important because it comes into play before specific projects are implemented, at the level of the plans and programmes that guide land use. In other words, whilst the EIA assesses the impacts of specific projects (such as a resort, a marina or a coastal development), the AAE assesses the environmental effects of municipal plans, urban development plans or detailed plans (which may set the framework for future construction in sensitive areas).

In short, Portuguese legislation contains several relevant instruments to protect the coastline, limit land uses incompatible with risk, safeguard coastal ecosystems and impose conditions on private uses of public land. **The weakness lies in the complexity and the difficulty of coordinating legislation, plans and the competent authorities. The framework can be considered satisfactory, but it becomes insufficient when the rules are not up to date, are not integrated into municipal plans, do not effectively regulate the granting of licences, or are not accompanied by timely enforcement.** The problem is not a lack of standards: it is the gap between the protection provided on paper and the protection actually ensured on the ground.

## THE PROBLEM IS NOT A LACK OF REGULATIONS. IT IS THE GAP BETWEEN PROTECTION ON PAPER AND PROTECTION ON THE GROUND

### Coordination between various planning instruments and competent authorities

Legislative fragmentation is reflected in the coordination between planning instruments and competent authorities. The protection of the coastline depends on instruments operating at different levels: the POCs define special safeguard regimes for the coastal strip, identify risk zones and establish permitted, restricted

<sup>52</sup> Many sections of the Portuguese coastline form part of the Natura 2000 network, such as the South-West Coast (the Natura 2000 designation for the coastal area largely corresponding to the South-West Alentejo and the Vicentina Coast, with Special Areas of Conservation (SAC) and Special Protection Areas (SPA) status), Arrábida/Espichel (Special Area of Conservation), Cabo Espichel (Special Protection Area), Ria Formosa (Special Area of Conservation and Special Protection Area), Ria de Aveiro (Special Area of Conservation and Special Protection Area), the Berlengas Islands (Special Area of Conservation and Special Protection Area), the Lagoa de Santo André (Special Protection Area), the Lagoa da Sancha (Special Protection Area) and various estuaries, such as the estuaries of the Minho and Coura rivers (Special Protection Areas), the Tagus (Special Protection Area) and the Sado (Special Area of Conservation and Special Protection Area).

<sup>53</sup> Decree-Law No. 151-B/2013, of 31 October.

<sup>54</sup> Decree-Law No. 232/2007 of 15 June. Article 3 of the Decree-Law stipulates that plans and programmes in the sectors of tourism, urban and rural planning, and land use, amongst others, are subject to environmental assessment where they provide a framework for the future approval of projects subject to environmental impact assessment. Plans and programmes that may affect Natura 2000 sites or that are deemed likely to have significant effects on the environment are also subject to environmental assessment.

or prohibited uses; municipal plans, in particular the PDMs, translate these provisions into local planning, classifying and zoning land, defining permitted uses and providing a framework for specific town development licensing decisions. Difficulties arise when this coordination is unclear, out of date or does not translate into effective conditions within the licensing procedure.<sup>55</sup>

Legally, municipal licensing does not take precedence over POCs, the REN (National Water Network), nature conservation schemes or risk areas. The local council must verify the project's compliance with applicable spatial plans, administrative easements, public utility restrictions and other legal and regulatory standards. However, when coastal constraints are not clearly reflected in municipal plans, the licensing process may, in practice, become the decisive moment of 'authorisation', even though it is legally subordinate to the applicable planning instruments and special frameworks.

The variety of bodies with responsibilities exacerbates this tension. The Portuguese Environment Agency is involved in the management of water resources, the public water domain and POCs; the Regional Development and Coordination Councils (CCDRs) in spatial planning and regional coordination; the Institute for Nature Conservation and Forests (ICNF) in protected areas, designated areas, habitats and species; the National Maritime Authority and the harbour master's offices in matters of coastal authority, safety and enforcement; and the local authorities in municipal planning, town planning permits and the supervision of town development operations. Such division of responsibilities may lead to fragmented decision-making, gaps in oversight and a dilution of accountability.

The main grey areas arise when the Municipal Master Plan (PDM) permits a particular use, but another special regime imposes restrictions that are unclear or insufficiently operationalised; when a sensitive area is not properly mapped or updated; or when a climate-related risk is known but is not yet reflected in the decision-making tools used. Consequently, a project may appear compatible with the PDM yet still be problematic in light of coastal erosion, cliff instability,

dune protection, sea-level rise, the REN, the Natura 2000 network, or climate adaptation objectives.

## The system's weaknesses

These weaknesses do not stem solely from regulatory fragmentation. Firstly, there are **coordination weaknesses**, as various bodies with distinct remits operate within the same territory (municipalities, APA, CCDR, ICNF, the Maritime Authority). Secondly, there are **planning weaknesses**: the POCs, PDMs, REN, risk mapping, and climate adaptation instruments are not up to date, coordinated, or reflected in land-use decisions.<sup>56</sup> Thirdly, there are **weaknesses in prior control**, where environmental, water, climate or nature conservation constraints do not effectively influence licensing decisions. Finally, there are **weaknesses in implementation and enforcement**, where the administrative response comes too late, after approval, construction or the consolidation of urban development expectations.



*The Sado Estuary.*

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<sup>55</sup> For example: a POC may identify an area as sensitive or at risk, but this information may not be properly incorporated into the PDM, may not appear clearly in the list of constraints, may be out of date, or may be treated as a separate sectoral opinion. In such cases, when the council assesses the project, the environmental or coastal constraint exists, but may not influence the decision as strongly as it should.

<sup>56</sup> Risk mapping is underpinned, in particular, by Article 13 of the RJIGT and by Decree-Law No. 115/2010 of 22 October on the assessment and management of flood risks. Climate adaptation instruments are underpinned by the Framework Law on Climate Change.

# 06

## **ANALYSIS OF FLOOD-PRONE COASTAL AREAS AND BEACH EROSION BY REGION**

*São Jacinto Beach.*

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The following is an **analysis of Portugal's 2500-kilometre coastline**, aimed at identifying the coastal areas most at risk.

To determine these areas, the most moderate **scenario for the progression of climate change** was used, assuming we do not reduce greenhouse gas emissions from the burning of fossil fuels. This is the scenario known as RCP8.5, in which global emissions peak around 2040, with an estimated increase in the global average temperature of 1.7 °C by 2100.<sup>57</sup>

The geographical division used is the one that divides Portugal into the following regions: North, Centre, West and Tagus Valley, Greater Lisbon and Setúbal Peninsula, Alentejo, Algarve, Madeira and the Azores.

## BY 2100, 40% OF PORTUGUESE BEACHES MAY BE AT RISK OF DISAPPEARING

### Northern Region

The North Coast is a flat strip of land surrounded by beaches and hills. It hosts the Natural Park of the North Coast, which extends along **16 km of coast**.

The coastline of the Northern Region is characterised by a strip of flat land surrounded by beaches and hills. Of particular note is the coastline at **Espinho**, where an average retreat of 5.2 metres per year.<sup>58</sup> In **Viana do Castelo**, the beach area has already shrunk by 30% since 1990 due to reduced sediment flow from the dams on the River Lima<sup>59</sup>.

The stretch of coastline between **Esmoriz and Torrão do Lameiro** is experiencing long-term erosion, evident in the significant retreat of the dune crest and insufficient sediment supply. Between 1958 and 2020, this stretch receded by a maximum of 280 m and, on average, 180 m, resulting in the loss of approximately 42 million m<sup>3</sup> of sand (1948–2005)<sup>60</sup>.

Human pressure, in the form of coastal infrastructure development, bears significant responsibility for the state of the coastline. Consequently, the construction of the port of Leixões has altered the natural dynamics of sand supply to the beaches, affecting 15 km of coastline.

Climate change is also affecting this coastline, manifesting through more intense winter storms and an accelerated rise in the mean sea level. According to national climate scenarios, the rate of sea level rise along the Portuguese coast has kept pace with the global acceleration trend (which hovers around 3.2 to 3.4 mm/year in recent decades), significantly increasing the risk of erosion and coastal overwash in vulnerable sectors of the northern coastline, such as **Póvoa do Varzim**.<sup>61</sup>

<sup>57</sup> <https://apambiente.pt/agua/estrategia-nacional-para-gestao-integrada-da-zona-costeira>

<sup>58</sup> [https://www.researchgate.net/publication/262467462\\_Risco\\_de\\_erosao\\_no\\_litoral\\_norte\\_de\\_Portugal\\_uma\\_questao\\_de\\_ordenamento\\_do\\_territorio](https://www.researchgate.net/publication/262467462_Risco_de_erosao_no_litoral_norte_de_Portugal_uma_questao_de_ordenamento_do_territorio)

<sup>59</sup> [https://run.unl.pt/bitstream/10362/16198/1/Cardona\\_2015.pdf](https://run.unl.pt/bitstream/10362/16198/1/Cardona_2015.pdf)

<sup>60</sup> <https://apambiente.pt/agua/analise-custo-beneficio-para-definicao-de-cenarios-de-adaptacao-alteracoes-climaticas-de>

<sup>61</sup> [https://rna2100.apambiente.pt/sites/default/files/inline-files/wp7c3\\_summary\\_card\\_coastal\\_areas.pdf](https://rna2100.apambiente.pt/sites/default/files/inline-files/wp7c3_summary_card_coastal_areas.pdf)

Concerning coastal flooding, areas with a higher risk have already been identified: **Vila do Conde** (affecting 12 per cent of the urban centre), **Póvoa de Varzim**, where three kilometres of the seafront promenade were affected by flooding in 2022, and **Cávado (Ofir)**, where 150 hectares of wetlands are at risk.

The consequences manifest as severe degradation of coastal ecosystems, particularly affecting littoral sand dunes. According to the National Implementation Report of the Habitats Directive overseen by the ICNF, the vast majority of maritime dune habitats in Portugal are officially classified under an unfavorable conservation status (inadequate or bad). This structural vulnerability is driven by fragmentation from tourism and urban infrastructure development, coupled with acute sediment deficits caused by climate-induced coastal erosion<sup>62</sup>.

## IN THE NORTHERN REGION, EROSION IS ALREADY AFFECTING BEACHES, DUNES, WETLANDS AND COASTAL INFRASTRUCTURE



*The Ofir Towers area.*

© Pedro Armestre / Greenpeace

According to forecasts for 2100 under the RCP8.5 scenario, sea levels could rise by 0.35 metres in this area, resulting in an average beach retreat of 35 metres. This puts an additional 85 km<sup>2</sup> area<sup>63</sup> at risk.

According to Climate Central's projections<sup>64</sup>, in the shorter term – by 2030 – the areas at risk along the north coast (from north to south) are: the mouth of the River Coura, the mouth of the River Âncora, Duna do Caldeirão beach, Gelfa beach, Afife beach, Marco Branco beach, Norte beach, Coral beach, Viana do Castelo, the Lima Estuary, Rodanho Beach, Amorosa Beach, Lordelo Beach, Castelo de Neiva Beach, Antas Beach, Esposende Beach, the North Coast Natural Park, Ofir Beach, Fão Beach, Estela Beach, Barranha Beach, Fragosa Beach, Redonda Beach, Póvoa de Varzim, the Ave River estuary, Areia Beach, Vila Chã Beach, Angeiras Sul Beach, Marreco Beach, Cabo do Mundo Beach, Azul Beach, Porto Leixões (cruise terminal), Gondarém Beach, the mouth and estuary of the River Douro, Lavadores Beach and Dunas Mar Beach.

## Centre Region and West and Tagus Region

The coastline of Portugal's Centre Region is **280 km** in length, stretching from the mouth of the Mondego River in Figueira da Foz, to Peniche. It features three major geomorphological units: a low, sandy coast (south of the Mondego), cliffs and rocky plateaux (Nazaré - Peniche), and estuaries such as the Mondego and coastal lagoons such as the Lagoa da Vela (Figueira da Foz).

On the other hand, the West and Tagus Valley Region, the western region and the bank of the Tagus River, combine an Atlantic coastline of significant natural value with beaches, cliffs and protected areas, together with a fertile agricultural plain.

According to scientific information available, in scenario RCP8.5, it is expected that by the year 2100, the sea level is to rise by 0.35 metres in this region, flooding 95 km<sup>65</sup>.

<sup>62</sup> <https://costadapta.energiagrancanaria.com/?p=852&lang=en>

<sup>63</sup> <https://www.ipma.pt/pt/index.html>

<sup>64</sup> <https://www.climatecentral.org/>

<sup>65</sup> IPMA (2023) - Projeções Climáticas

Accelerated coastal erosion, the progressive rise in mean sea level projected for the coming decades, and the structural loss of dune habitat integrity driven by anthropogenic pressure constitute the primary environmental threats in this area.

The effects of human activity are evident along this stretch of coastline. These include a reduction in sediment from the **River Mondego** (blocked by the presence of dams) and saltwater intrusion (caused by increased seawater inflow into the estuary). Projections for 2100 under the SSP8.5 scenario show that the problem is only just beginning, as it is estimated that 18 per cent of the Mondego estuary will be flooded, leading to the salinisation of 2,000 hectares of agricultural land (rice paddies).

Sediment dynamics in the municipality of **Figueira da Foz** exhibit a strongly asymmetrical pattern due to the presence of port infrastructure. Whilst the northern section and the urban beaches of Buarcos show a trend towards stability or sand accumulation caused by the retention effect of the northern breakwater, the beaches situated south of the Mondego river mouth face a situation of extremely severe coastal erosion. At Cova-Gala Beach, the chronic shortage of alluvial sediments and the shift in the coastal drift have resulted in historic coastal retreat, averaging over 2 metres per year in recent decades, putting homes at risk and forcing the Portuguese Environment Agency (APA) to carry out ongoing artificial sand nourishment operations to mitigate the collapse of the dune system.<sup>66</sup>

The **São Jacinto Dunes** (Nature Reserve) have decreased by 40% since 1980. Meanwhile, the **Sado Estuary** has seen 50% of its wetlands disappear thanks to urbanisation between 1960 and 2020.<sup>67</sup>

A special case is the vulnerability of **Aveiro** coast and estuary. This suffers from coastal erosion due to a lack of sediment inflow, as more than 50 dams in the Douro basin (both in Portugal and Spain) hold back 92% of the sediment that formerly supplied the beaches. In turn, the construction of infrastructure (such as the Port of Aveiro and various breakwaters) is altering coastal dynamics and preventing sand from reaching the coast. The coastline is constantly retreating: the stretch between **Espinho and Mira** experiences an average erosion rate of 1.5 m/year, with critical points such as **Vagueira**, where the sea

advances up to 3 m/year. The storms in early 2026 caused the beach to disappear entirely during high tide, exposing the breakwater to direct sea action. In **Espinho and Furadouro**, the storms of January 2026 caused partial collapse of various sections of the breakwater. In Espinho, the sea compromised the seafront promenade's support structures, revealing how vulnerable traditional engineering solutions are to the Atlantic's new forces.



**UP. Figueira da Foz.**

© Pedro Armestre / Greenpeace

**DOWN. Nazaré.**

© Pedro Armestre / Greenpeace

<sup>66</sup> [https://apambiente.pt/sites/default/files/\\_SNIAMB\\_Agua/DLPC/POC\\_OMG/v\\_final/4A\\_POCOMG\\_RelatorioAmbiental.pdf](https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC_OMG/v_final/4A_POCOMG_RelatorioAmbiental.pdf)

<sup>67</sup> ICNF (2022) - "Plano de Gestão da RN São Jacinto"

On the **Costa Nova**, a retreat of 5,2 meters per year in the last 50 years has been recorded. A retreat of 200 meters by 2100 is predicted, threatening beaches such as **Cortegaça** and urban areas.<sup>68</sup> This being a low-lying area, the risk of flooding is high, and engineering works, such as breakwaters, increase it in



**UP. Espinho.**

© Pedro Armestre / Greenpeace

**DOWN. Arcozelo.**

© Pedro Armestre / Greenpeace

areas like **Murtosa**<sup>69</sup>. Erosion caused by this year's storms left a sand ledge more than two meters high along a large stretch of the beach, destroying the residual dune system that protected the famous colourful houses. At the same time, saline intrusion affects both freshwater aquifers and farmland, particularly in **Baixo Vouga Lagunar**<sup>70</sup>. This stretch of coastline's vulnerability is worsened by urbanisation in risk areas: illegal building on the dunes and on riverbanks. In **Esmoriz** and **Furadouro**, the sea has reached houses during storms that hit this coast.<sup>71</sup> The forecasts regarding climate change are far from encouraging for this coastal area: local studies warn that 30 per cent of the current coastline could be flooded by 2100 if action is not taken before then.<sup>72</sup>

According to Climate Central's projections within the closest timeframe, by 2030 the risk areas on the coast of the Centre Region and West and Tagus Valley Region (from north to south) are: the dunes of Esmoriz, Praia Velha de Cortegaça, Praia de São Pedro de Maceda, the area of the Aveiro Estuary, mouth of the Mondego River, mouth of the Lis River, Praia de São Pedro de Moel, Praia das Valeiras, Praia da Água de Madeiros, Praia Pedra do Ouro, Praia da Polvoeira, Praia da Mina, Praia de Vale Furado, Praia Vale do Inácio, Praia da Légua, Praia da Falca, Praia da Areeira, Nazaré lighthouse, port of Nazaré, mouth of the Alcoa River, Praia de São Gião, bay of São Martinho do Porto, the area of Lagoa de Óbidos, coastline of Peniche, Porto Batel, Praia do Seixo, Praia dos Frades, Praia de Vale Pombas, Praia do Paimogo and Praia da Areia Branca.

## Greater Lisbon Region and Setúbal Peninsula

The coastline of the Lisbon Region is 150 km in length, from the mouth of the Tagus River to Sines. The Tagus River estuary is Portugal's largest wetland, covering 320 km<sup>2</sup>.

The coast of the Setúbal Peninsula, to the south of Lisbon, is also one of Portugal's richest and most diverse. It stretches from the mouth of the Tagus River

<sup>68</sup> [https://expresso.pt/dossies/dossies\\_ciencia/dossie\\_mes\\_do\\_ambiente\\_do\\_expresso\\_2012/mar-pode-engolir-quase-100-metros-da-costa-de-aveiro=f765794](https://expresso.pt/dossies/dossies_ciencia/dossie_mes_do_ambiente_do_expresso_2012/mar-pode-engolir-quase-100-metros-da-costa-de-aveiro=f765794)

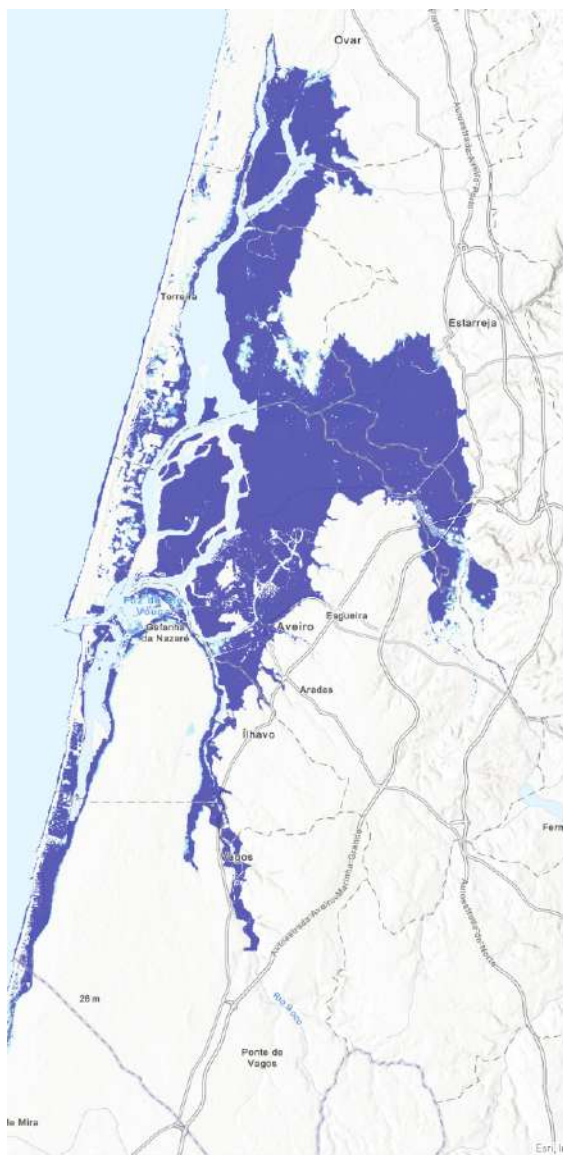
<sup>69</sup> <https://www.publico.pt/2025/02/07/local/noticia/sociedade-riaviva-vai-investir-86-milhoes-euros-zona-costeira-lagunar-aveiro-2121776>

<sup>70</sup> <http://ww3.aeye.pt/avcult/hjco/Aveirria/Pg000540.htm>

<sup>71</sup> <https://www.publico.pt/2004/09/20/sociedade/noticia/erosao-aveiro-e-sul-de-espinho-sao-as-zonas-mais-problematicas-1203907>

<sup>72</sup> <https://www.rtp.pt/noticias/pais/sem-catastrofismos-investigadores-de-aveiro-corrigem-previsoes-de-subida-do-nivel-do-mar-para-portugal-es1414674>

to the Arrábida Mountains, combining **extensive beaches**<sup>73</sup>, **fossil cliffs**, **dune systems**, **estuaries** and **protected areas**.



**Image of Aveiro's floodplain area in 2050.**

Source: SNM Portugal. *Cenários de Inundação Extrema Costeira*

The main risks these three stretches of coastline face are the acceleration of coastal erosion, urbanisation, increased floods in urban areas and the collapse of ecosystems essential for the coast's survival due to the disappearance of natural barriers against storms and flooding, as well as the loss of endemic and migratory species in its waters.

### **COSTA NOVA: 5.2 METRES PER YEAR OF COASTAL RETREAT OVER THE LAST 50 YEARS. BY 2100, THE RETREAT COULD REACH 200 METRES**

The ecosystems at the highest risk of collapse are the salt marshes of the **Tagus Estuary**, which have already suffered historical losses in their extent due to urbanization and face problems of saline intrusion and pollution<sup>74</sup>. An increase in salinity has been observed in the inner areas of the estuary due to the deeper penetration of the saline wedge during storms at the beginning of the year, impacting the marsh ecosystems. Data from the Hydrographic Institute confirms that during the storm surges of March 2026, salinity in areas such as Vila Franca de Xira reached critical levels for the marsh ecosystem<sup>75</sup>. Their current state prevents recovery without large-scale human intervention.<sup>76</sup>

Also standing out are the **dunes of the Caparica coast**, 60% of which were destroyed by development, leading to the critical endangerment of endemic species such as Portuguese Thyme (*Thymus carnosus*), which take root in the sand and help dune formation. Moreover, there are controversial new projects to build hotels in dune areas, despite warnings from the APA. Research has revealed that without dunes in good condition, coastal erosion could accelerate.<sup>77</sup> The cliffs of Caparica also suffer from frequent landslides due to extreme rainfall. The winter of 2026 will not soon be forgotten due to the sea's encroachment onto the urban area of **Caparica**. The combination of spring tides and low atmospheric pressure caused the water to overflow the defensive walls, flooding the first-line streets.<sup>78</sup> The **beaches of São João** have lost so much sand that high tide now hits concrete structures directly.

<sup>73</sup> Portugal's longest beach – and one of the longest in the world – stretches along the coast of the municipality of Grândola, running from the Tróia Peninsula to Melides beach, a distance of 45 km.

<sup>74</sup> <https://elpais.com/sociedad/2020-09-25/el-tejo-en-lisboa-cuando-la-sal-ataca.html>

<sup>75</sup> [https://apambiente.pt/sites/default/files/SNIAMB\\_Agua/DRH/MonitorizacaoAvaliacao/Relat%C3%B3rio/ano\\_hidrologico\\_2024\\_2025.pdf](https://apambiente.pt/sites/default/files/SNIAMB_Agua/DRH/MonitorizacaoAvaliacao/Relat%C3%B3rio/ano_hidrologico_2024_2025.pdf)

<sup>76</sup> *Estudo da Universidade de Lisboa, 2023*

<sup>77</sup> <https://www.icnf.pt/cogestao/cgreservanaturaldoestuariodotejo>

<sup>78</sup> <https://expresso.pt/meteorologia/2026-02-11-deslizamento-de-terras-retira-mais-de-30-pessoas-na-costa-da-caparica-46209819>

The salt marshes of the Tagus Estuary represent one of the most important wetlands in Europe, playing a crucial role in biodiversity conservation and coastal protection. Although these ecosystems have suffered strong historical pressure and fragmentation due to industrial and port development predominantly concentrated on the south bank and the Lisbon waterfront<sup>79</sup>.

With regard to biodiversity, a case worth mentioning is the *Posidonia* meadows in Setúbal, where the underwater forests formed by this plant have been reduced due to pollution and anchoring by vessels.<sup>80</sup>

Another issue affecting this area is the acidification of marine waters, which weakens the shells and exoskeletons of many marine species and is having a serious impact on the biodiversity<sup>81</sup> of the **Sado River**. Moreover, marshes have shrunk by more than 60% since 1990, and sole catches have fallen from 200 t/year in 1990 to 40 t in 2023.<sup>82</sup>

The threats arising from climate change and urbanisation are spreading along its coastline. The **Praia da Caparica (Almada)** has thus lost 200 metres of sand since 1960. The artificial sand nourishment carried out since 2007 has cost €5 million per year.

The floods caused by rising sea levels have affected **Alcântara** (Lisbon), with permanent flooding of 0.5 metres, while in **Almada**, 12% of the urban area is at risk of flooding. Meanwhile, the salinisation of the aquifers is increasingly a major problem in **Setúbal**.

More recent extreme weather events have resulted in serious damage. In 2026, storms flooded the **Algés** seafront promenade, causing €2 million worth of damage.<sup>83</sup> The marine heatwave of 2022, with water temperatures 4°C above average, caused a massive die-off of mussels.<sup>84</sup> The storms of winter 2026 seriously affected many areas of this region. Among them can be highlighted:

- **Baixa district in Setúbal** (historic centre): due to this being a flood plain where various waterways converge and with highly sealed soils, any torrential rain causes the system to collapse

totally. Temperatures at the start of 2026 caused huge damage to infrastructures and commercial establishments, estimated at around €50 million.

- **Coast of Caparica (Almada)**: already suffering from serious coastal erosion. During winter storms, extremely strong sea disturbances caused waves to overtop breakwaters and destroy access routes to beaches and to urban areas closest to the coastline.
- **Alcácer do Sal**: although slightly more to the south, the Sado Estuary is seriously affected when intense rainfall coincides with high tide, flooding the piers, the seafront promenade and streets closest to the town.
- **Algés (Oeiras) and Alcântara** (Lisbon): true “hotspots” for urban flooding in the district. Because they are at the bottom of two valleys and next to the river, they are completely flooded within minutes when it rains heavily.
- **Baixa district in Lisbon (Praça do Comércio and surroundings)**: Torrential rainfall and the high tide of the Tagus cause the river to “block” the drain-water collector outlets, and the water is unable to drain away, causing damage.

Based on the scientific information available, in the RCP8.5 scenario, by 2100, the sea level is forecast to rise by 0.35 metres, putting 150,000 people at risk<sup>85</sup>

According to Climate Central’s projections within the closest timeframe, by 2030 the risk areas on the coast of the Lisbon Region and the Setúbal Region (from north to south) are: Praia de Porto Dinheiro, Praia de Valmitão, Praia das Conchas, Praia de Porto Novo, Praia do Seixo, Praia da Mexilhoeira, Praia da Vigia or Praia da Amanhã, Praia de Santa Cruz, Praia do Penedo do Guincho, Praia Formosa, Praia das Amoeiras, mouth of the Sizandro River, Praia de Porto Chão, Praia da Ponta da Vela, Praia das Hortas, Praia de Cambelas, Praia das Peças, Praia da Assenta, Praia das Escandinhas, Praia de Calada, Praia do Portinho Correia, Praia de São Lourenço, Praia dos Coxos, Praia

79 <https://www.icnf.pt/cogestao/cgreservanaturaldoestuariodotejo>

80 <https://restoringhabitats.ccmr.ualg.pt/pradarias-marinhas-no-estuario-do-sado>

81 <https://www.ualg.pt/de-que-forma-acidificacao-dos-oceanos-pode-alterar-o-comportamento-das-especies-marinhas>

82 <https://www.dgrm.mm.gov.pt/>

83 <https://www.dn.pt/sociedade/oeiras-avana-com-obra-de-24-milhes-de-euros-no-passeio-martimo-de-als>

84 IPMA (2022)

85 <https://expresso.pt/sociedade/2019-05-23-Subida-do-nivel-do-mar-ameaca-quase-150-mil-portugueses>



Tróia  
© Pedro Armestre / Greenpeace

do Banco do Cavalinho, Praia de Pesqueira, Praia do Penedo Mouro, Praia de Mil Regos, Praia da Orelheira, Praia do Matadouro, Praia de São Sebastião, Praia dos Pescadores, Praia da Baleia, mouth of the Lizandro River, Praia de São Julião, Praia da Vigia, Praia do Giriberto, Praia do Magoito, Praia da Aguda, Praia das Azenhas do Mar, Praia das Maças, Praia Pequena do Rodízio, Praia Grande do Rodízio, Praia da Adraga, Praia do Cavalo, Praia do Caneiro, Praia da Ursa, Praia da Aroeira, Praia do Porto do Touro, Praia da Grota, Praia do Abano, the area of the mouth of the Tagus River, area of the Tagus River Nature Reserve (including Lisbon), the area of the coast of Caparica, Lagoa da Albufeira, Praia do Meco, Praia das Bicas, Praia da Pipa, Praia de Areia do Mastro, Sesimbra, Portinho da Arrábida, the beaches of Sado and the Sado Estuary Nature Reserve.

## THE STORMS OF 2026

## AFFECTED AREAS THAT ARE ALREADY HIGHLY VULNERABLE



Melides.

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## The cases of Grândola and Sesimbra

Coastal urbanisation in Portugal has a multiplier effect on critical risks in a climate-change scenario, where rising sea levels (3.7 mm/year) are already exceeding the global average. The destruction of essential natural barriers, such as dune systems and marshes – which act as our first line of defence against erosion, flooding and saline intrusion – means excessive development undoes the area's natural resistance and further exposes people and property to catastrophes. This scenario is becoming particularly alarming in the **municipalities of Sesimbra and Grândola**, which are arising as prime examples of the systematic failure in implementing protection standards in municipal planning.

he main weakness involves the gap between the 'Coastal Zone Programmes' (POCs) and the 'Municipal Directors Plans' (PDMs). **Although the POCs set out strict systems, these are no longer effective when they are not implemented in PDM**, which are plans directly and indirectly binding for private individuals. In **Sesimbra**, the PDM dates from 1998, overlooking decades of development in mapping out risks and protection proposals from the Natura 2000 Network. In **Grândola**, access to information on permits is being systematically blocked, hampering civic oversight on the part of movements and voluntary associations. These examples particularly take the spotlight with the new urbanisation projects on the coast of **Melides, Comporta and Tróia that are underway**. Moreover, the Portuguese Environment Agency (APA) is taking measures to safeguard free and public access to all beaches on the coast of **Grândola**. Inspections recently carried out, following countless complaints, led the APA to undertake checking 22 beaches along 45 km of coastline, with two beaches found to have controlled access and seven with restricted access for tourist complexes. This involves Troia-Galé and Galé-Fontainhas, Brejos, Torre, Camarinhas, Duna Cinzenta, Golfinhos, Garças and Pinheiro.<sup>86</sup>

<sup>86</sup> <https://es.euronews.com/green/2025/07/27/una-popular-playa-convertida-en-inaccesible-zona-de-lujo-en-portugal-una-sombrilla-en-una->

## Concrete's encroachment on the Natura 2000 Network

Luxury developments are occupying unique biomass, often under the banner of “eco-resorts”, but with an irreversible impact:

- **Sesimbra (Meco and Azoia):** Projects such as **Pinhal da Prata, Pinhal do Atlântico and the Etosoto** eco-hotel take up more than 260 hectares within the Special Areas of Conservation (SACs) and the Arrábida Natural Park. These permits proceed without aggregate Environmental Impact Assessments (EIAs), thereby breaching European standards.
- **Tróia and Grândola Peninsula:** The “**Na Praia**” project (96 hectares), launched by Sandra Ortega, foresees the construction of a luxury resort, including a hotel, villas, a spa and a heliport, in an area of 96 hectares. This undertaking is to be partly realised on coastal dunes, at the entrance of the **Tróia Peninsula**, a high-value ecosystem protected by the Natura 2000 Network and by the reservation of the Sado River estuary. The works were suspended by court order for one month following a lawsuit filed by the Dunas Livres ecology platform<sup>87</sup>. Subsequently, in March 2026, the facilities were subject to a fire – the cause of which remains unknown – at a time when the project’s construction was already in its final phase.
- Also in this area is **Vanguard Properties**, which kept the shares of the failed Espírito Santo bank, and has projects taking up more than 1000 hectares, such as the Torre project with two hotels, 234 homes and a golf course.<sup>88</sup>
- Projects such as **Costa Terra and Comporta Dunes** violate the Faixa Costeira de Proteção (“Coastline Protection”) since they place golf courses at least 500 metres from the waterline.

## Socioeconomic impact and “privatisation” of the coastline

Super-rich tourism occupying the coastline fails to generate wealth for local populations, but instead excludes them:

- **Collapse of small-scale fishing:** In Sesimbra, the sealing of the soils on the cliffs increases pollution run-off, wrecking marine “nurseries”, drastically reducing catches and compelling fishers to sail increasingly further out in search of fish.
- **Segregation and gentrification:** The increased cost of living and accommodation forces residents out of villages such as Meco e Azoia.
- **Use of precarious workforce:** The recourse to a low-skilled workforce, with low wages and temporary contracts, as reported by various associations such as Solidariedade Imigrante.<sup>89</sup>
- **Privatisation of access:** The APA’s inspections in 2025 revealed that ten beaches between Tróia and Melides have access restricted by walls or physical barriers of private enterprises, such as Spatia on Praia do Pinheiro. The closure of the Galé Campsite is a prime example of the loss of democratic access to the coastline.

## Threats to water resources and climate resilience

Intensive urbanisation in Grândola and Tróia is hindering recharge of the **Tagus-Sado aquifer**, which is essential for local economies facing drought. The removal of natural vegetation and the construction of low-lying sandbanks reveal a complete lack of strategic vision regarding the predicted rise in sea level, which – we should remember – could reach 0.35 meters in this area by 2050, with damage estimated at €150 million a year.

## THE COAST MUST NOT BE A PRIVILEGE

<sup>87</sup> [https://expresso.pt/economia/economia\\_turismo/2024-05-31-uma-nova-comporta-entre-troia-e-melides-descubra-onde-e-como-estao-os-principais-investimentos-turisticos](https://expresso.pt/economia/economia_turismo/2024-05-31-uma-nova-comporta-entre-troia-e-melides-descubra-onde-e-como-estao-os-principais-investimentos-turisticos)

<sup>88</sup> <https://www.economiadigital.es/galicia/empresas/sandra-ortega-resort-portugal-troia.html>

<sup>89</sup> <https://www.tsf.pt/sociedade/artigo/associacao-responsabiliza-governo-pela-situacao-que-levou-imigrantes-a-serem-explorados-temos-uma-economia-que-mata/18024907>

## Alentejo Region

The Alentejo coastline stretches out 150 km, **from Sines to the mouth of the Guadiana River**. It encompasses significant protected spaces, such as the Mira Estuary (Nature Reserve) and the Vicentina coast (Natural Park). The Alentejo coastline is situated at a critical crossroads between tourist development and conservation.



*Praia de Odeceixe.*

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**Vila Nova de Milfontes**, where erosive progression at Furnas beach and the **Mira estuary** requires recurrent artificial beach nourishment interventions to protect the dune system; **Zambujeira do Mar**, whose urban settlement at the cliff top is classified as a high-risk zone due to the geomorphological instability of the cliffs, severely limiting new construction under the POC Espichel-Odeceixe coastal management plan; and **Odeceixe beach**, where the main environmental pressure is concentrated on the heavy summer tourism load and unregulated parking in dune protection zones and the maritime public domain<sup>90</sup>.

The result is accelerated coastal erosion, which is also due to rising sea levels.<sup>91</sup>

More intense storms and marine heatwaves are also expected, during which water temperatures will be higher than average.<sup>92</sup>

The repercussions are already being felt in fishing: there was a 20,9% decline in octopus catches (2023) due to water warming (1.8 °C on the continental shelf) and pollution from toxic substances originating from farming<sup>93</sup>.

Without urgent measures, 50% of natural beaches may disappear by 2100, and economic damage will surpass €200 million a year.<sup>94</sup>

Projections of the impact of climate change on the coastline reveal that, under the moderate RCP8.5 scenario, by 2100, sea level is expected to rise by 0.35 metres.

According to Climate Central's projections within the closest timeframe, by 2030 the risk areas on the coast of the Alentejo Region (from north to south) are: Carrasqueira, Praia da Comporta, Praia do Pego, Lagoa de Santo André, Porto de Sines, Praia de Morgavel, Praia da Foz, Praia do Burrinho, Praia da Samoqueira, Praia do Salto, Praia do Banho, Praia Pequena, Praia da Baía de Porto Covo, Praia do Sissal, Ilha do Pessegueiro, Praia do Queimado, Praia dos Aivados, Praia da Cruz, Praia do Malhão, Praia do Burro, stretch between Praia da Angra da Cerva and Praia do Farol, area of the mouth of the Mira River and stretch between Praia das Furnas beach and Praia da Carriagem.

**ALENTEJO AT RISK: UP TO 50 %  
OF THE BEACHES COULD  
DISAPPEAR BY 2100**

<sup>90</sup> [https://dspace.uevora.pt/rdpc/bitstream/10174/5439/1/Gama,%20C%20and%20Baptista,%20P.%205%C2%BA%20Simposio%20Margem%20Atlantica%20Ib%C3%A9rica\\_2006.pdf](https://dspace.uevora.pt/rdpc/bitstream/10174/5439/1/Gama,%20C%20and%20Baptista,%20P.%205%C2%BA%20Simposio%20Margem%20Atlantica%20Ib%C3%A9rica_2006.pdf)

<sup>91</sup> <https://mag.sapo.pt/artigo/a-areia-das-praias-portuguesas-esta-mesmo-a-desaparecer-6a5ca1844f27158af5809a26>

<sup>92</sup> <https://cnnportugal.iol.pt/el-nino/temperaturas/ipma-alerta-que-el-nino-ja-comecou-e-preve-fenomeno-forte-ate-2027/20260716/6a58f814d34ef>

<sup>93</sup> [https://www.barlavento.pt/wp-content/uploads/2024/05/EPesca\\_2023.pdf](https://www.barlavento.pt/wp-content/uploads/2024/05/EPesca_2023.pdf)

<sup>94</sup> <https://ihu.unisinos.br/categorias/660201-mudancas-climaticas-quase-metade-das-praias-do-mundo-pode-sumir-ate-2100>

## Algarve Region

The Algarve's coastline stretches out for 200 km, from Lagos to Vila Real de Santo António. It features various ecosystems fundamental to preserving its coastline, such as Ria Formosa, the cliffs of Ponta da Piedade, the Barrinha da Alvor dune systems, Praia do Ancão, and the Posidonia meadows.

The Algarve is facing a **perfect storm between unsustainable development and climate change. Without immediate action, 40% of beaches may disappear by 2100, and economic damage will be severe**<sup>95</sup>.

Urban development pressure is very intense in sensitive areas along its coastline. In recent decades, there has been extensive construction in high-risk areas.

The coastal stretch between Vilamoura, Quarteira and Garrão is highly vulnerable due to chronic sediment deficit and the progressive retreat of the coastline, exacerbated by intense urban development pressure and seasonal storms. In direct response to the serious

erosion risks threatening the cliffs and local infrastructure, the Portuguese Environment Agency (APA) and the local council have implemented a major artificial beach nourishment project, which involved the initial deposition of 1.4 million cubic metres of sand along the coast.<sup>96</sup>

In **Praia da Rocha (Portimão)**, there are consolidated buildings and tourism infrastructure located within the 100-meter safeguard zone that are exposed to the geomorphological instability of the limestone cliffs. This requires frequent interventions by the Portuguese Environment Agency (APA) for block stabilization and controlled rockfalls, along with severe restrictions on new construction. On the other hand, on **Tavira Island**, which is integrated into the Ria Formosa lagoon ecosystem, human pressure on the maritime public domain is concentrated on managing beach facility concessions and controlling illegal parking and camping in dune areas—sectors where the Maritime Police and natural park authorities conduct regular enforcement actions to ensure the integrity of the dune system.<sup>97</sup>



praia do **Evaristo**  
beach

PERIGO | DANGER

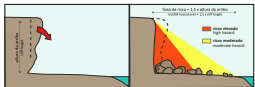
**PERIGO DE  
DESMORONAMENTO**

**ROCKFALL  
HAZARD**





A evolução (erosão) natural das arribas processa-se numa sequência intermitente e descontínua de derrocadas instantâneas que constitui perigo para os utentes das praias. A **FAIXA DE RISCO** corresponde à área passível de ser ocupada pelos resíduos do desmoronamento e tem largura até 1,5 vezes a altura da arribo. Quanto mais próximo da arribo estiver, mais provável é ser atingido pelos blocos de uma derrocada. Para sua segurança permaneça afastado do topo e da base das arribas, bem como de penedos isolados.



Natural cliff evolution (erosion) progresses by intermittent and discontinuous series of rockfall and cliff collapses. Cliff evolution is a potential menace for people standing on beaches accumulated at the cliff base. **HAZARD AREAS** correspond to areas where it is likely that effects of debris will be felt and its length reaches up to 1.5 times cliff height. The closer to the cliff is more likely to be hit by the collapse of a block. For your safety, keep away from cliff base and cliff edge, as well from sea stacks.








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*Image of a sign warning of the danger of landslides.*

<sup>95</sup> <https://www.nature.com/articles/s41558-020-0697-0>

<sup>96</sup> [https://apambiente.pt/sites/default/files/\\_A\\_APA/Comunicacao/Media/NotasOCS2026/nota\\_ocs\\_46-2026\\_ministradoambienteeneergiaisitain-tervencaodeprotecaocosteiranoalgarve.pdf](https://apambiente.pt/sites/default/files/_A_APA/Comunicacao/Media/NotasOCS2026/nota_ocs_46-2026_ministradoambienteeneergiaisitain-tervencaodeprotecaocosteiranoalgarve.pdf)

<sup>97</sup> [https://www.researchgate.net/publication/234139546\\_Praia\\_da\\_Rocha\\_Algarve\\_Portugal\\_um\\_paradigma\\_da\\_antropizacao\\_do\\_litoral](https://www.researchgate.net/publication/234139546_Praia_da_Rocha_Algarve_Portugal_um_paradigma_da_antropizacao_do_litoral)



*Três Castelos Beach.*

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The number of cliffs at risk of collapse is extremely high in the Algarve Region:

- **Albufeira Municipality:** Praia dos Alemães - East, Praia dos Alemães - West, Praia dos Arrifes, Praia dos Aveiros, Praia das Belharucas, Praia do Castelo, Praia da Coelha, Praia do Evaristo, Praia da Galé - East, Praia da Galé - West, Praia do Inatel, Praia Manuel Lourenço, Praia Maria Luísa, Praia dos Olhos d'Água, Praia da Oura - East, Praia da Oura - West, Praia do Peneco, Praia de S. Rafael, Praia de Santa Eulália, Praia das Belharucas - East, Praia da Falésia - East, Praia da Falésia, Praia da Falésia - Açoteias, Praia da Rocha Baixinha - West.
- **Aljezur Municipality:** Praia Adegas - Odeceixe, Praia do Amado, Praia da Amoreira, Praia da Arri-fana, Praia do Monte Clérigo, Praia de Vale Figuei-ra, Praia do Vale dos Homens.
- **Lagoa Municipality:** Praia de Albandeira, Praia dos Beijinhos, Praia de Benagil, Praia dos Caneiros, Praia do Carvalho, Praia do Carvoeiro, Praia da Cova Redonda, Praia Grande, Praia da Marinha, Praia do Molhe, Praia do Paraíso, Praia do Pintadinho, Praia da Sr.<sup>a</sup> da Rocha, Praia dos Tremoços, Praia do Vale de Centeanes, Praia de Vale Covo, Praia de Vale Olival.
- **Lagos Municipality:** Praia Batata-Estudantes, Praia do Camilo, Praia de D. Ana, Praia do Pinhão, Praia do Porto de Mós
- **Portimão Municipality:** Praia do Alvor - East, Praia do Amado, Praia do Barranco das Canas, Praia dos Careanos, Praia Prainha - Três Irmãos, Praia da Rocha - Nascente, Praia da Rocha - West, Praia dos Três Castelos, Praia do Vau
- **Silves Municipality:** Praia de Armação de Pera - East, Praia de Armação de Pera - West
- **Vila do Bispo Municipality:** Praia do Beliche, Praia do Burgau, Praia de Cabanas Velhas, Praia do Castelejo, Praia da Cordoama, Praia das Furnas, Praia da Ingrina, Praia da Mareta, Praia da Salema, Praia do Tonel, Praia do Zavial

In February 2026, storms in the southwest caused significant damage to the tourist beaches in Albufeira and Quarteira. The SIAL's monitoring data and the CIMA (University of Algarve) technical reports confirm that a succession of southwesterly storms in February 2026 reduced the land surface area of **Praia da Rocha** by 20% compared with July 2025 levels, making the system extremely vulnerable during the tourist season. The significant impact of extreme events led to a drastic reduction in the beach width at **Praia dos Pescadores**, with the water reaching the terraces of hospitality establishments during storms. In **Quarteira**, the artificial sand nourishment performed in 2025 was completely swept away by the sea in less than a year.

When it comes to the risk of collapses, the soil's saturation due to intense rainfall at the start of the year, coupled with the impact of waves at the base of the cliffs, led to significant collapses on the cliffs in the **Lagos (Praia de Dona Ana) and Lagoa area**, forcing authorities to extend the exclusion zones for safety reasons.

According to the report by the Portuguese Environment Agency, published in March this year<sup>98</sup>, between June 2025 and February 2026, a retreat of the coastline was recorded of up to 14 metres in the **Quarteira - Forte Novo section**, the retreat of the coastline reached **14 metres** between June 2025 and February 2026, with a large part of this movement having occurred during February's storms. In sand and clay cliffs (such as those at **Alfamar**), retreats of up to **6 metres** at the clifftop were recorded, resulting from base collapse due to wave action. In addition, more than 740 incidents were recorded along the coastline, including the destruction of access points in Albufeira and Loulé.

Projections of the impact of climate change on the coastline reveal that, under the RCP8.5 scenario, by 2100, sea level is expected to rise by 0.35 metres placing the **Ria Formosa** and **Tavira** coastline at risk<sup>99</sup>.

Storms are expected to become more intense<sup>100</sup>. Sea-surface warming (reaching 2.3°C higher in the Ria Formosa) and wastewater pollution led to a drop in bivalve catch.<sup>101</sup>

**According to Climate Central's projections within the closest timeframe, by 2030 the risk areas on the coast of the Algarve Region (from north to south)** are: Ribeira de Aljezur, stretch between Praia de Monte Clérigo up to Praia da Arrifana, Praia da Pedra Agulha, Praia do Canal, Praia de Vale Figueiras, Praia da Bordeira, Praia da Murração, Praia da Pena Furada, Praia do Mirouço, Praia da Barriga, Praia do Castelo, Praia da Águia, Praia da Ponta Ruiva, Praia das Eiras, Praia do Telheiro, Pedra das Gaivotas, Cabo de Sagres, Prainha das Poças, Praia da Baleeira, Praia do Martinhal, Praia dos Rebolinhos, Ilhotes do Martinhal, Praia do Barranco, Praia do João Vaz, Praia da Ingrina, Praia do Zavial, Praia das Furnas, Praia da Figueira, Praia de Salerma, Praia da Boca do Rio, Praia de Almádena, Praia das Cabanas Velhas, Praia dos Rebolos, Praia do Burgau, Praia do Napz, Praia de Porto Mós, Ponta da Piedade, Praia da Balança, Praia do Camilo, area of the Odiáxere shore, area of the Arade shore, Praia do Paraíso, Praia do Carvoeiro, Praia do Vale de Centeanes, Praia do Pau, Praia do Barranquinho, Praia da Morena, Praia do Barranco, Praia dos Abracinhos, Praia dos Beijinhos Este, area of the Alcantarilha shore, area of Lagoa dos Salgados, Praia da Galé, Praia dos Bés, Praia de Manuel Lourenço, Praia do Evaristo, Praia das Salamitras, Praia dos Arrifes, Praia dos Alemães, Praia da Oura, Praia dos Olhos de Água, Praia de Vilamoura, Praia de Quarteira, Praia do Vale do Lobo, stretch from Praia do Anção up to Praia de Cacela Velha, Praia de Monte Gordo and the Sapal de Castro Nature Reserve.

## ALGARVE: 40 % OF BEACHES AT RISK BY 2100

98 RELATÓRIO TÉCNICO: Síntese das ocorrências na faixa costeira de Portugal continental (11/03/2026)

99 <https://apambiente.pt/agua/pooc-vilamoura-vila-real-de-santo-antonio>

100 <https://www.correiodamanhacanada.com/mortandade-de-bivalves-na-ria-formosa-ameaca-sustentabilidade-da-ameijoa/>

101 <https://quercus.pt/blog/2021/03/03/poluicao-na-ria-formosa-coliformes-fecais-e-bivalves-nao-sao-a-combinacao-perfeita/>



## Madeira Region

The coastline of Madeira is **250 km in length**, including Porto Santo. A coastline brimming with cliffs, natural pools, and intertidal zones cannot escape the impacts of development and climate change. Madeira is facing unique challenges due to both its rugged orography and dependence on tourism.

By 2050, one of the primary risks identified in the CLIMA-Madeira strategy is the increased vulnerability to hydro-geomorphological hazards, such as flash floods and mass movements on coastal slopes. In the ecological domain, climate change—manifested through rising temperatures and prolonged droughts—exacerbates the risk of wildfires, threatening the integrity of the unique Laurissilva forest ecosystem and the conservation of its endemic species.

Urban development pressure on the islands of Madeira and Porto Santo has led to the development of spatial planning studies aimed at mitigating the fragmentation of ecosystems on the cliffs and in the ‘arriba’ areas, where the dense historic road network has shaped the coastline. As for the impacts of climate change, the rise in mean sea level is evident



**UP.** Porto de Abrigo, Porto Santo Island.

© Pedro Menezes / Greenpeace

**DOWN.** Ponta do Sol, Madeira Island.

© Pedro Menezes / Greenpeace

through coastal overtopping and periodic flooding in the low-lying areas of Funchal's seafront during severe Atlantic storms. At the same time, the beach on the island of Porto Santo is highly susceptible to coastal erosion and a sediment deficit resulting from the disruption of the natural dynamics of its streams and the pressure exerted by human infrastructure on the dune system, which has led to severe retreat of the shoreline on the side exposed to the sea.<sup>102</sup>

## MADEIRA: COASTAL RISK EXACERBATED BY THE TERRAIN AND URBAN DEVELOPMENT



*The natural pools of Porto Moniz, Madeira Island.*

© Pedro Menezes

The Region of Madeira faces growing challenges due to the intensification of extreme weather events, characterized by the severity of heavy precipitation episodes and marine storm surges. Additionally, the progressive rise in sea surface temperature and the occurrence of marine heatwaves are altering the metabolism of local underwater ecosystems. Compounding these climate pressures is the chronic impact of microplastic pollution in the North Atlantic, which has been extensively documented by local researchers due to its deposition in coastal areas and ingestion by marine species.

According to Climate Central's projections, within the closest timeframe, by 2030 the risk areas on the coast of Madeira are: natural pools of Porto Moniz, Ponta da Ladeira, stretch from Farol da Ponta do Parago up to Praia da Ponta do Sol, Praia da Tábua, Calhau da Lapa, Praia da Fajã dos Padres, Fajã do Cabo Girão, Praia do Vigário, the stretch from Formosa up to Praia São Lourenço, stretches from Miradouro da Ponta do Rosto up to Miradouro do Boqueirão, Praia do Faial, the shoreline area Ponta Delgada and the shoreline area of Seixal. Ilha do Porto Santo: all of the northern coastline (from Ponta Branca up to Praia Zimbralinho), Ponta da Calheta, Praia Cabeço da Ponta, stretches from Porto do Porto Santo to Ponta dos Ferreiros.

## Azores Region

The Autonomous Region of the Azores has approximately 840 kilometers of coastline distributed across its nine islands of volcanic origin. The archipelago hosts marine ecosystems of high ecological importance, such as coral gardens (including black coral), hydrocoral fields, intertidal zones with endemic biodiversity, and unique ecosystems like the Lagoa da Caldeira de Santo Cristo. Currently, these areas face pressures and vulnerabilities associated with climate change, whose projected impacts threaten the integrity of coastal ecosystems, vital port infrastructures, and traditional socioeconomic sectors such as fishing and tourism.

Official projections integrated into the Regional Programme for Climate Change of the Azores (PRAC)<sup>103</sup> point toward differentiated scenarios of mean sea level rise throughout the 21st century, estimating variations that depend on emissions models (such as SSP2-4.5 or SSP5-8.5). These models identify risks of coastal overtopping and increased erosion affecting regional port infrastructures and vulnerable population centers. Contrary to fictional extreme scenarios, the islands' airport runways—including the infrastructure in Santa Maria—are safeguarded by strict civil engineering criteria, although low-lying surrounding areas require continuous monitoring. Detrital *fajãs*, due to their geological genesis, present a natural susceptibility to slope movements and cliff collapses, which are exacerbated by extreme precipitation events.

<sup>102</sup> <https://www.ambienteonline.pt/noticias/aprovado-plano-de-gestao-da-regiao-hidrografica-da-madeira-2022-2027>

<sup>103</sup> <https://portal.azores.gov.pt/web/draac/aae-prac>



Porto Judeu. Terceira Island.  
© António Araújo / Greenpeace

Monitoring carried out by entities such as the Portuguese Institute for Sea and Atmosphere (IPMA) and research centers at the University of the Azores confirms trends consistent with global warming, such as a gradual sea level rise of around 2 to 4 mm per year (aligned with the global average) and progressive ocean acidification due to the absorption of atmospheric  $\text{CO}_2$ . This chemical alteration of the marine environment constitutes a potential threat to calcifying organisms and deep benthic ecosystems. The increase in sea water temperature has also promoted the occurrence of seasonal marine heatwaves and shifts in the distribution of pelagic species, indirectly affecting the trophic chains that sustain cetaceans and local fishing dynamics.

### THE COASTAL CRISIS ALSO THREATENS THE UNIQUE ECOSYSTEMS OF THE AZORES

Regarding land management, pressure on the coastline is severely regulated through each island's Coastal Zone Management Plans (POOC) and their respective Municipal Master Plans (PDM). These planning instruments prohibit and enforce against illegal construction within the maritime public domain, ensuring minimal soil artificialization rates and the protection of dunes and sensitive areas against uncontrolled urbanization. Additionally, regional authorities and scientific centers promote continuous monitoring campaigns for marine litter and microplastics in the coastal and oceanic ecosystem, aiming to quantify the density of pollutants on the region's beaches with scientific rigor.

A detailed review of coastal dynamics by island highlights the following management and vulnerability aspects:

**São Miguel:** The main challenges focus on vulnerability to coastal erosion and marine overtopping episodes in vulnerable areas of Ponta Delgada and Ribeira Grande. Local planning management plans strictly delimit risk zones, conditioning waterfront infrastructure. The Lagoa das Sete Cidades, being an inland lagoon located in a volcanic caldera with no connection to the ocean, does not suffer from any marine saltwater intrusion or sea-related level rise, with its management focused on controlling eutrophication and freshwater quality. According to Climate Central's projections

for 2030, the areas at risk on the island's coast are: Santa Barbara beach, Portinho das Calhetas, stretch of coast from Miradouro da Vigia to the natural pools of Santo António, stretch from A Porta do Diabo to Poça da Rasoula, stretch from Rocha do Cascalho to Ponta Delgada Airport, stretch of coast from Lagoa up to Praia da Amora, Praia do Fogo, stretch of coast from Povoação to Farol dos Fenais da Ajuda, area of coast from Maia, area of coast from Porto Formoso, stretch of coast from Moinhos to Farol do Cintrão.

**Santa Maria:** Praia Formosa, known for its unique geological and sandy characteristics in the archipelago, is the subject of rigorous monitoring of sedimentary dynamics to assess the impacts of erosion caused by winter storms. According to Climate Central's projections for 2030, its entire coastline is at risk of flooding.

**Terceira:** Coastal management in Praia da Vitória and Angra do Heroísmo focuses on maintaining coastal defense structures and monitoring Baía da Salga against episodes of heavy swells. The use and occupation of the island's scarce *fajãs* comply with strict planning restrictions to prevent construction in hazardous zones. According to Climate Central's projections for 2030, its entire coastline is at risk of flooding.

**Pico:** Coastal protection focuses on safeguarding the Landscape of the Vineyard Culture (a World Heritage site) and preserving deep marine ecosystems and adjacent channels, where important cold-water coral communities are located under scientific surveillance. According to Climate Central's projections for 2030, 90% of its coastline is at risk of flooding.

**Faial:** In the city of Horta, maritime-port infrastructures and coastal communication routes (such as sections of the Regional Road) are frequently subject to inspections, slope consolidation, and coastal protection works to mitigate the effects of sea-induced erosion. According to Climate Central's projections for 2030, 80% of its coastline is at risk of flooding.

**Graciosa:** Environmental management focuses on protecting its basal aquifer and water resources against potential contamination risks, ensuring public supply through rigorous monitoring in Santa Cruz da Graciosa. According to Climate Central's projections for 2030, 80% of its coastline



is at risk of flooding (except the stretch between Baía do Forno e Baía do Por-do-Sol).

**São Jorge:** The *fajãs* of São Jorge (such as Fajã dos Cubres and Fajã de Santo Cristo) are protected reserve areas designated by UNESCO. The primary focus of local authorities relies on preventing geological risks from mass movements (landslides from high cliffs) that can be triggered by earthquakes or intense rainfall. According to Climate Central's projections for 2030, its entire coastline is at risk of flooding.

**Flores:** The port of Lajes das Flores and its adjacent coastal infrastructures have historically faced the impact of severe North Atlantic storms, requiring continuous investment in reconstruction and structural reinforcement to ensure the island's connectivity. According to Climate Central's projections for 2030, 90% of its coastline is at risk of flooding.

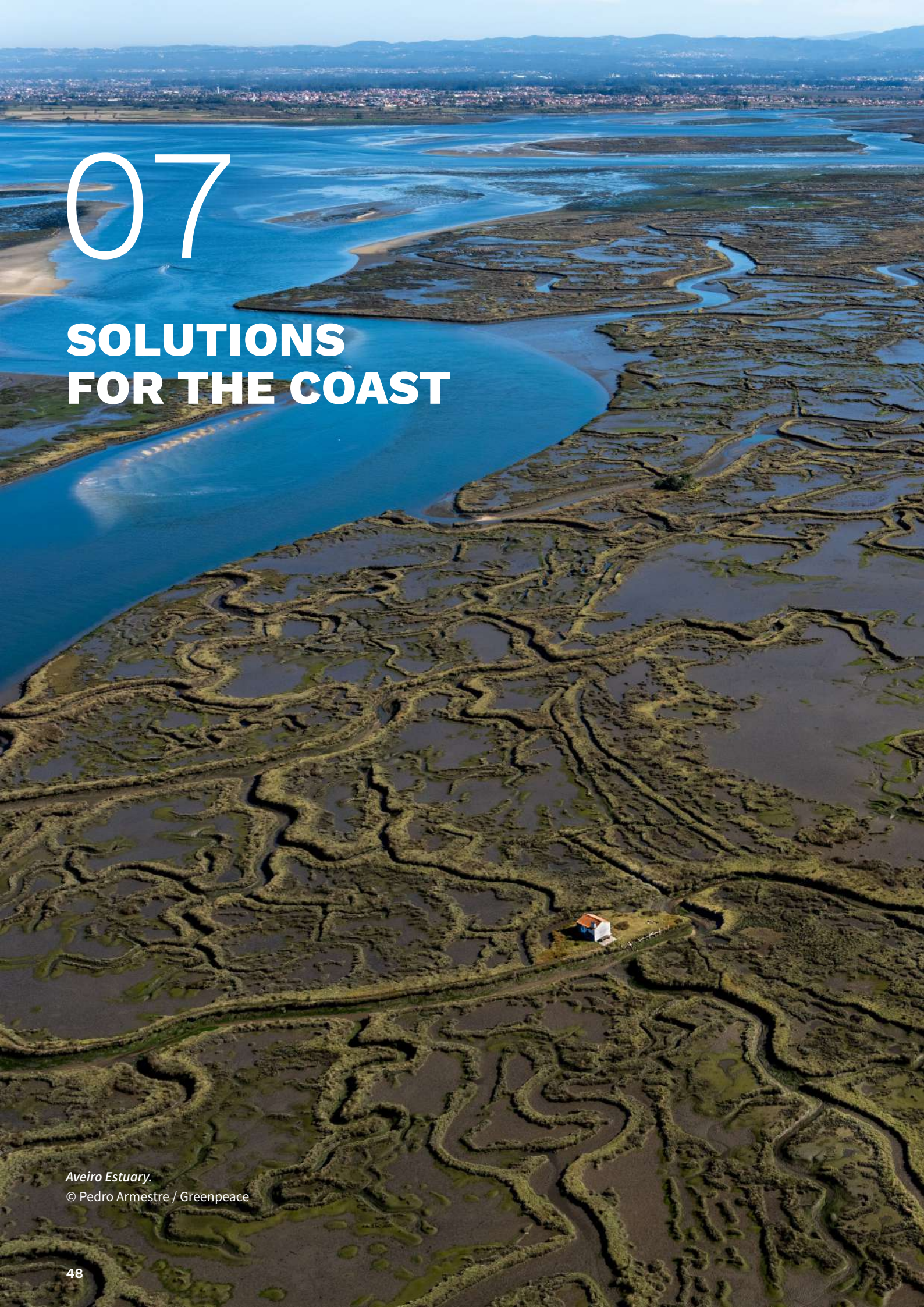
**Corvo:** Being the smallest island in the archipelago, Vila do Corvo is located on a low lava platform,

*Fajã de Baixo, Ilha de São Miguel.*

© António Araújo / Greenpeace

which is why territorial planning instruments give top priority to civil protection infrastructure and the management of its waterfront in the face of extreme weather events. According to Climate Central's projections for 2030, 90% of its coastline is at risk of flooding.

**THE COAST NEEDS LESS  
CONCRETE, MORE NATURE  
AND MORE PREVENTION**



# 07

## **SOLUTIONS FOR THE COAST**

*Aveiro Estuary.*

© Pedro Armestre / Greenpeace

The science is clear about the reality of climate change and its impacts, as well as the necessary mitigation and adaptation measures to be implemented. Climate change brings about an imbalance in natural and human systems, leading to an exponential increase in risks, many of which have already reached critical levels, entailing social, economic and environmental costs. A great number of specialists have for some time now been warning that thresholds are being exceeded and that, faced with the increasingly evident consequences, urgent action is required.

**Here, we present several measures that Greenpeace deems necessary to safeguard Portugal's coastline.**

## Urgent and ambitious climate action

The climate crisis is already upon us and, as this report reveals, is increasingly serious. The good news is that there are solutions for tackling this.

The planet's future depends on protecting nature and creating a new energy system that ends reliance on fossil fuels and shifts to renewable energy. It is essential to change our socioeconomic model, which fails to respect the planet's limits, and to advocate reducing demand, efficiency, thrift and intelligent solutions, sustainable food-supply and transport models, and to urgently make headway towards an energy system that is 100% renewable, democratic, socially and environmentally respectful and fair.

Portugal appears to be struggling to reach the goals of the Paris Agreement (2015). The commitments undertaken within the scope of this global agreement oblige the country to cut its greenhouse gas emissions by 45-55% by 2023 (compared to its 2005 emissions), to achieve carbon neutrality by 2050, and to increase the renewable energy produced in Portugal by 80% by 2030.<sup>104</sup>

## Protecting, restoring and renaturalising the coast

According to the Portuguese Environment Agency (APA), over 60% of Portugal's coastline is either developed or under development. This excessive urbanisation of the coast, occupying and artificialising the first few metres of the shoreline, alongside building barrier infrastructures as a traditional measure for protecting the coastline or regulating sediment supply, is making the coastline extremely vulnerable and lacking ecosystem mechanisms that could protect it.

The situation at the start of this year suggests it is highly advisable to dismantle critical infrastructure, such as walls, whose role is proving counterproductive, and to strategically remove buildings (as in Ovar and da Caparica).

In the face of current climate-change scenarios, nature and its processes are the best allies in mitigating the impacts of rising sea levels, flooding, and storms on coastal areas. Moreover, coastal and marine ecosystems play a crucial role in mitigating climate change through carbon capture (known as "blue carbon"). It is estimated that properly restoring and managing blue-carbon ecosystems such as wetlands, marshes and marine meadows would enable the storage of around 840 million additional tonnes of CO<sub>2</sub> by 2030, the equivalent of 3% of annual global greenhouse gas emissions.<sup>105</sup>

**Nature-based Solutions (NbS)** are measures that use the natural processes of ecosystems to mitigate negative impacts. These include protecting, regenerating and sustainably managing ecosystems, as well as introducing elements in spaces that use or imitate these natural processes. They provide multiple benefits not only in adapting to climate change but also for society, quality of life, and biodiversity. They are also less expensive and easier to implement than the more classic and challenging adaptation measures

<sup>104</sup> PNEC 2030 (Plano Nacional Energia e Clima)

<sup>105</sup> Macreadie *et al.* 2021. Blue carbon as a natural climate solution. *Nature Reviews Earth & Environment* 2:826- 839.

using grey infrastructure – constructing dikes, walls and breakwaters – and allow greater flexibility in the face of changing scenarios. It is essential to prioritise rebuilding sandspits, which act as dynamic barriers, rather than concrete breakwaters, to ensure that the sands survive.

It is **vital to preserve the remaining stretches of virgin coastline**. These are treasures that need to be maintained, especially the wetlands, beaches, and dunes, as they remain untouched protective barriers. It is likewise important to properly protect and manage at least 30% of the ocean surface.

Adaptation measures must be urgently implemented in urbanised or semi-urbanised areas, prioritising NbS that include the restoration and rewilding of marine and coastal ecosystems. For instance, beaches can be established and protected by creating or extending

dune spaces or planting species adapted to sandy areas. For ecosystems to recover their natural roles, they require sufficient space. A dune area trapped between the sea and a physical barrier (such as a wall, seafront promenade, or car park) lacks space to expand and establish itself. Each case has to be studied, and, where necessary, the demolition of existing infrastructure has to be proposed to create enough space and relocate it away from the coastal area at risk.

Given the cost of adaptation measures, they need to be prioritised that provide structural solutions to erosion, setting aside those that only provide temporary solutions, such as the **artificial nourishment of beaches or the maintenance of obsolete infrastructure** destined to disappear. Greenpeace's recommendation is clear: Portugal must shift from a “holding the line” policy to one of “retreat management”, prioritising the withdrawal of infrastructure at points where the sea has already won the battle.

Monitoring how the coastline is evolving and recovering the public maritime domain is essential for reinforcing the coastline's resilience.

The law should be applied to protect the coast and its inhabitants. Despite the Climate Framework Law (2021) and the Decree-Law regulating the drawing up and implementation of POCs (DL No 159/2012) restricting construction at least 500 metres from the shoreline, there is considerable resistance among municipalities to complying with these conditions.

The **EU Regulation on nature restoration**<sup>106</sup> is a mandatory European Union legislative act directly applicable to Member States, which entered into force in August 2024 and represents a historic opportunity to restore nature in the EU and to guarantee a safer, more sustainable, and healthier future for its population, with targets for 2030 and 2050. Emphasis is placed on the fundamental role of ecosystems in mitigating and adapting to climate change, setting out urgent measures and targets for restoring degraded ecosystems, including coastal and marine ecosystems (Articles 4 and 5). The importance of NbS in achieving its targets is highlighted by its multiple benefits for the environment, society, and the economy.

## DUNES, SALT MARSHES AND COASTAL GRASSLANDS ARE NATURAL DEFENCES



*Alagoa Beach, Porto Santo Island.*

© Pedro Menezes / Greenpeace

<sup>106</sup> <https://www.consilium.europa.eu/es/press/press-releases/2024/06/17/nature-restoration-law-council-gives-final-green-light/>

## Reducing risk exposure

Twentieth-century urban planning and regulation, conceived in a wholly different social and environmental context, make no sense and have no place in today's context. Urban planning and land management need to be adapted to the twenty-first century, within the context of climate change. There is a raft of measures to be adopted in this field. Among them:

- Using data and mapping on the impact and risks of flooding and erosion as basic planning tools that lessen the exposure of people and critical infrastructure to these risks.
- Avoiding rebuilding and inhabiting areas seriously affected by flooding or sea storms.
- Halting urban-planning projects underway that foresee construction in areas at risk of flooding, until a risk analysis has been conducted, taking into account both current climate-change conditions and the future forecast for these.
- Long-term planning is urgently needed, which includes measures that can truly guarantee the coastline's survival. In this vein, all Coastal Zone Programmes (POCs) urgently need to be reviewed and adapted to address the threats posed by climate change.
- Banning the classification of land as fit for development, the hazardousness of which has been mitigated after a structure has been built.

## Cross-cutting, local and participatory adaptation

Adapting to climate change involves a strong local component, which is why the risks and vulnerabilities in each municipality must be analysed and translated into specific adaptation plans.

Adaptation strategies at both national and regional levels are needed to establish a suitable, coherent framework with aligned targets and to put forward the necessary tools for adaptation to reach the local level.

Likewise, citizens must be included and take part in drawing up the plans, as well as in communicating and educating about risks and adaptation measures, to ensure a proper understanding of the most suitable risks and measures, particularly when rearranging and recovering coastal space becomes inevitable. In this respect, local early-warning systems need to be developed for protecting against these risks.

## Tackling the problem of excessive coastal development

Controlling urbanisation pressure requires urgent measures: rigorously enforcing coastal laws and sanctioning and demolishing illegal structures. The regulation restricting construction at least 500 metres from the shoreline was conceived with two aims: protecting both the coastline and citizens. Land-use planning needs to be rigorously reviewed, with infrastructure and residences in critical areas relocated.

**WHERE THE SEA HAS ALREADY  
GAINED GROUND, THE RETREAT  
MUST BE PLANNED**

# 08

## CONCLUSIONS

*Furadouro.*

© Pedro Armestre / Greenpeace

Beyond statistical data and maps of risk and economic indicators, the destruction of Portugal's coastline entails an irreparable loss of our identity and well-being. The shoreline is not just an economic asset; it is also the setting for our family holidays, evenings with friends, and the traditions that shape who we are.

**The 2026 diagnosis is unequivocal: Portugal's coastline is facing not only a climate crisis but also a systemic failure in planning and monitoring.**

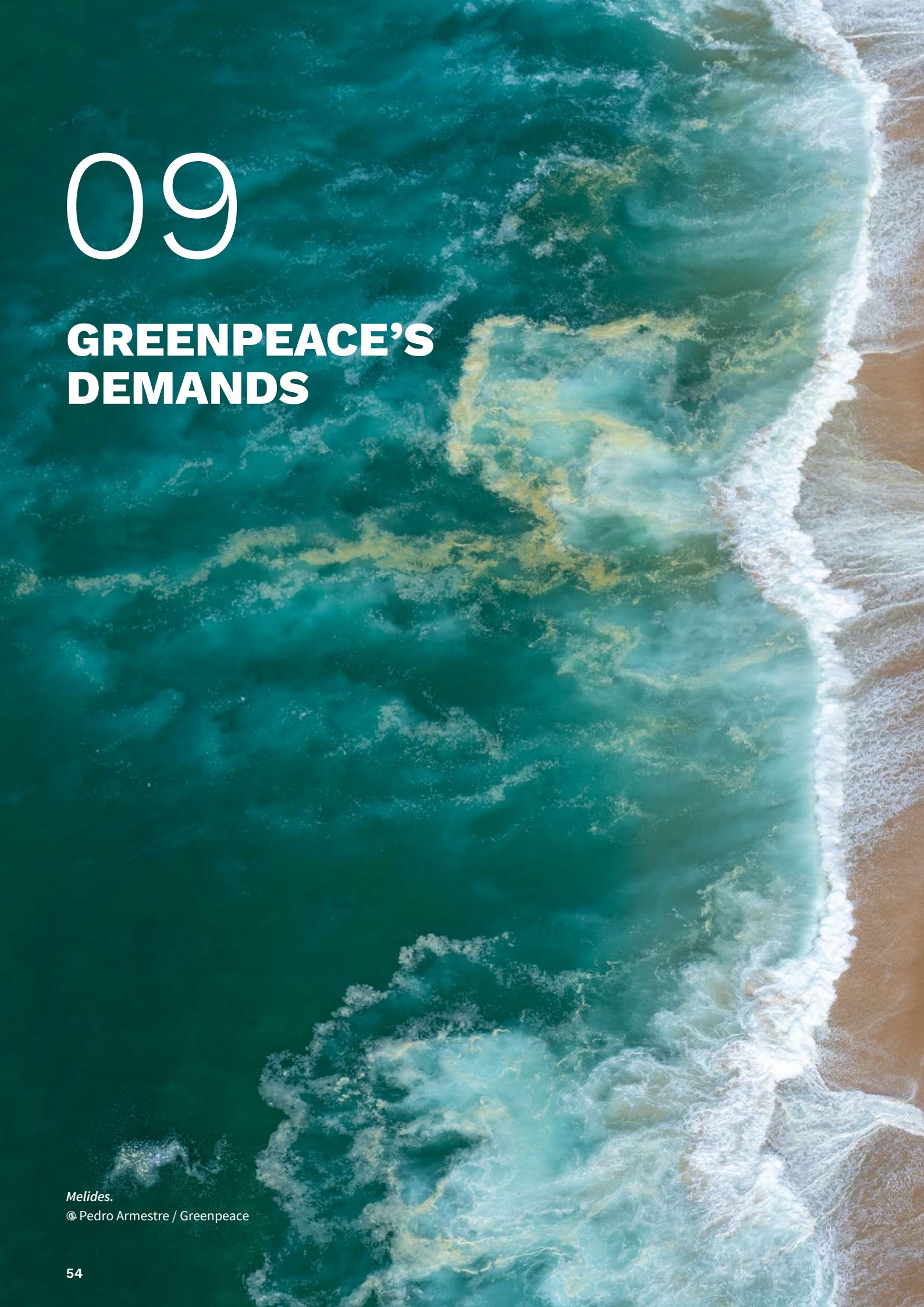
Although Portugal's sea-level rise (3.7 mm/year) is above the global average and erosion is already affecting 60% of the continental coastline, the political response remains beholden to other interests. The greatest weakness concerns the implementation of the protection standards of the Coastal Zone Programmes (POCs) and the Municipal Directors' Plans (PDMs). This loophole allows municipalities such as Sesimbra to operate under obsolete 1998 plans, ignoring decades of risk mapping and facilitating projects in conservation areas. This inertia is dooming iconic locations to fade into "historic memories": the beaches of São João da Caparica saw the sea leap over defences and directly hit the concrete. Moreover, under the banner of "eco-resorts", projects such as the Pinhal da Prata (Sesimbra) or "Na Praia" (Grândola) are occupying unique biomass and fragmenting Natura 2000 Network habitats. This super-rich tourism is driving out communities that are the shoreline's soul, through gentrification and the destruction of small-scale fishing. With professions wiped out and age-old traditions under threat, the country is sacrificing its cultural wealth in the name of immediate profits.

Lastly, a covert "privatisation" with walls, barriers, and private security is being witnessed, hindering or putting people off using the coast. The closure of the Galé Campsite and the prohibitive cost of the Setúbal-Tróia crossing are examples of how a beach is being sold as a luxury for the few. At present, ten beaches between

Tróia and Melides are restricted in access, impeding families' constitutional right to enjoy the sea freely.

**Despite the severity of the scenario outlined, this report is not a verdict of inevitable destruction, but rather a call to action, based on hope and scientific knowledge. We have the opportunity and the resources to preserve this trend and protect the beauty of a coastline that calls for our respect. The time to act is now.**

**THIS REPORT IS NOT A VERDICT  
OF INEVITABLE DESTRUCTION, BUT  
A CALL TO ACTION. IT IS TIME TO ACT**

An aerial photograph of a coastline. The ocean is a deep teal color, and a large, irregular area of yellowish-brown oil spill is visible, extending from the shore into the water. The waves are white and foamy as they break against the sandy beach on the right side of the image.

# 09

## **GREENPEACE'S DEMANDS**

*Melides.*

© Pedro Armestre / Greenpeace

Greenpeace demands a paradigm shift, switching from “holding the line” to strategically managing the territory:

### **Compliance with Law**

We demand that the central government and the CCDR declare the immediate suspension of the PDM standards that did not implement the POCs up to the legal deadline, preventing new permits in sensitive areas.

### **Moratorium on construction in risk areas**

Immediately halting all tourist projects underway or planned in areas pinpointed as at risk of flooding or erosion by 2050, as well as within the boundaries of the Natura 2000 Network.

### **Nature Restoration and Nature-based Solutions (NbS)**

Favouring – whenever possible – “physical works” and the artificial nourishment of beaches being replaced with programmes for restoring sandspits and marshes, allowing the ecosystems to act as natural barriers.

### **Transparency**

Removing all physical barriers hindering public access to beaches and the mandatory and transparent publication of all urban-planning permit processes.

### **Climate and socioeconomic justice**

Adopting tourist charges and taxes on the fossil-fuel industry to finance local adaptation and supporting the transition of traditional coastal economies. This is already underway in locations such as Venice, where the introduced tourist charge has helped reduce coastal pollution; Mallorca, where the applied tourist charge helps protect the coast; and Barcelona, where this charge is also used to adapt schools to extreme heat.

# **DESTRUCTION** all along the coast

**Portrait of a Portuguese coast  
under threat**

**JULY 2026**

**GREENPEACE**

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