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# TOWARDS COASTAL LANDSCAPE GOVERNANCE

## INSIGHTS ACROSS TIME AND SPACE FROM NORTHERN PORTUGAL

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**Venice: Looking across the Lagoon at Sunset,** Joseph Mallord William Turner. Tate, Accepted by the nation as part of the Turner Bequest 1856. Photo: © Tate.



"A paisagem imensa a cada hora muda de cor e o mar infinito acompanha ao longe esta sinfonia maravilhosa. Se eu fosse pintor, dava isto com três brochas cheias de tinta – uma pincelada maior, para o mar azul que não tem fim, até à linha doirada do areal – outra para o mar verde e raso dos milheirais, na larga planície que vai de Montedor até Viana – outra enfim verde-escura para o biombo recortado que cinge esta faixa desde Caminha até à foz do Lima."

Raúl Brandão,
**Os Pescadores.**

**For Susana.**

© Arquivo Municipal de Lisboa | Apanha do sargaço [Harvesting of seaweed], Artur Pastor, PT/ AMLSB/ART/009/011130

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# Abstract

The governance of coastal regions involves a complex network of institutions and actors operating across different administrative scales. This complexity, spanning scales, stakeholders, and instruments, frequently gives rise to conflicts of various kinds. Over recent decades, coastal regions in many parts of the world have undergone significant transformations due to the process of coastal occupation. These transformations, partly driven by climate change and compounded by current societal challenges, have contributed to a growing scientific consensus on the need to reform coastal governance systems, integrating the dynamics of coastal socio-ecological systems into planning and management instruments. At the same time, landscape governance is increasingly recognised in scientific debate. Its main goal is to reconnect multi-level governance with the natural conditions of places, emphasising the benefits of the landscape concept. Scientifically, the landscape is recognised as a socio-ecological system which plays a central role in quality of life. However, so far, landscape governance has primarily overlooked the coastal landscape.

Two main research gaps were identified during this investigation based on a systematic literature review of coastal governance and landscape governance. The first gap refers to the lack of scientific evidence on how landscape has been conceptualised and integrated into coastal governance systems. The second focuses on the lack of data on the effects of this conceptualisation and integration on the evolution of coastal landscapes. This doctoral thesis explores these research gaps in Portugal, analysing how the conceptualisation and integration of landscape have evolved within different coastal planning institutions, particularly at the national and regional levels (Northern Portugal), and evaluating how this development has influenced the evolution of coastal landscapes at the municipal level, namely in Vila do Conde, Póvoa de Varzim, and Esposende. The research methodology follows an explanatory multiple-

case study approach, using qualitative content analysis and spatiotemporal analysis over the last sixty years as the primary methods.

The main findings reveal a significant increase in references to landscape in the instruments analysed, both at the national and regional levels. However, this increase has been accompanied by a diminishing emphasis on the integrative potential of landscape science. The research uncovers varying degrees of landscape integration in the three regional coastal management instruments evaluated (study Landscape Recognition of the Coastal Zone between Caminha and Cortegaça 1977/78, the Coastal Zone Management Plan Caminha- Espinho 1999, and Coastal Zone Programme Caminha-Espinho 2021) and corresponding levels of protection. The findings suggest that greater landscape integration could significantly enhance coastal landscape protection, underscoring the need to prioritise landscape in coastal governance. The Landscape Recognition of the Coastal Zone between Caminha and Cortegaça 1977/78 study, developed by the landscape architect Ilídio de Araújo, could have significantly altered the evolution of the coastal landscape in Northern Portugal had it been implemented. In addition, the research revealed that various political paradigms have significantly shaped coastal landscape governance, reflecting the role of influential actors as well as external influences, particularly from the European Union. The results also highlight the role of several landscape planning and management instruments, such as the National Ecological Reserve, the National Agricultural Reserve, and the National Protected Areas System, in mitigating the negative impacts of urban development. Furthermore, the main results are discussed in light of evolutionary governance theory, highlighting the influence of path dependence, institutional barriers, fragmented and sectoral governance structures, and the limited political will to reform or modify the coastal governance system.

Finally, the research presents several recommendations aimed at contributing to a future European research agenda towards coastal landscape governance.

**Keywords:** Evolutionary governance theory; Landscape sustainability science; Plans evaluation; Landscape policy integration; Integrated Coastal Zone Management.



# Resumo

A governação da região costeira envolve uma complexa rede de instituições e atores que operam em diferentes escalas administrativas. Frequentemente, esta complexidade de escala, intervenientes e instrumentos resulta em conflitos de diversas naturezas. Ao longo das últimas décadas, regiões costeiras, em vários locais do mundo, sofreram transformações significativas devido ao processo de ocupação do litoral. Essas transformações, em parte impulsionadas pelas alterações climáticas, associadas aos atuais desafios societais, têm contribuído para um crescente consenso científico sobre a necessidade de reformar o sistema de governação costeira, de forma a incorporar as dinâmicas do sistema socio-ecológico costeiro, nos seus instrumentos de ordenamento e gestão costeira. Paralelamente, a governação da paisagem é cada vez mais reconhecida no debate científico. Esta tem como objetivo principal reconectar a governação multinível com as condições naturais dos lugares, enfatizando os benefícios do conceito de paisagem. Cientificamente, a paisagem é *per si* reconhecida como um sistema socio-ecológico, que desempenha um papel central na qualidade de vida. Contudo, até ao momento, empiricamente, a governação da paisagem praticamente não se tem debruçado sobre a paisagem costeira.

Ao longo desta investigação foram identificadas duas lacunas de investigação principais, baseadas numa revisão sistemática da literatura científica sobre governação costeira e governação da paisagem. A primeira lacuna refere-se à falta de evidência científica sobre como é que a paisagem tem sido conceptualizada e integrada nos sistemas de governação costeira. A segunda foca-se sobre a falta de dados sobre os efeitos desta conceptualização e integração na evolução da paisagem costeira. Esta tese de doutoramento explora essas lacunas de investigação em Portugal, analisando como é que a conceptualização e a integração da paisagem evoluíram em diferentes instrumentos de ordenamento costeiro, focando-se, particularmente nas escalas nacional e regional (Norte de

Portugal) e avaliando como é que esse desenvolvimento influenciou a evolução da paisagem costeira a nível municipal, nomeadamente em Vila do Conde, Póvoa de Varzim e Esposende. A metodologia de investigação segue uma abordagem explicativa de estudo de caso múltiplo, utilizando como métodos principais uma análise qualitativa de conteúdo e uma análise espaciotemporal ao longo dos últimos sessenta anos.

Os principais resultados revelam um aumento significativo nas referências à paisagem nos instrumentos analisados, tanto a nível nacional como regional. No entanto, esse aumento tem sido acompanhado por uma diminuição na ênfase do potencial integrador da ciência da paisagem. A investigação revela graus variados de integração da paisagem nos três instrumentos regionais de ordenamento costeiros avaliados (estudo de Reconhecimento Paisagístico da Faixa Costeira de Caminha a Cortegaça 1977/78, Plano de Ordenamento da Orla Costeira Caminha-Espinho 1999 e Programa da Orla Costeira Caminha-Espinho 2021) e níveis correspondentes de proteção. Os resultados sugerem que uma maior integração da paisagem poderia aumentar significativamente a proteção da paisagem costeira, sublinhando a necessidade de priorizar a paisagem na governação costeira. O estudo de Reconhecimento Paisagístico da Faixa Costeira de Caminha a Cortegaça 1977/78, desenvolvido pelo arquiteto paisagista Ilídio de Araújo, poderia ter alterado significativamente a evolução da paisagem costeira do Norte de Portugal, se tivesse sido implementado. A investigação também revelou que diversos paradigmas políticos moldaram significativamente a governação da paisagem costeira, refletindo o papel de atores influentes, bem como de influências externas, nomeadamente da União Europeia. Os resultados destacam ainda o papel de vários instrumentos de planeamento e gestão da paisagem, como a Reserva Ecológica Nacional, a Reserva Agrícola Nacional e o Sistema Nacional de Áreas Protegidas, na mitigação dos impactos negativos do desenvolvimento urbano. Para além disso, os principais resultados são discutidos à luz da teoria da governança evolutiva, salientando a influência da dependência de trajetórias, a existência de barreiras institucionais, de estruturas de governação fragmentadas e setoriais e da falta de vontade política para reformar ou modificar o sistema de governação costeira.

Por último, a investigação apresenta várias recomendações que visam contribuir para uma futura agenda de investigação europeia para a governação paisagística do litoral.

**Palavras-chave:** Teoria da governança evolutiva; Ciência da sustentabilidade da paisagem; Avaliação de planos; Integração de políticas de paisagem; Gestão Integrada da Zona Costeira.

# List of Abbreviations

| | |
|---|---|
| **AGR** | Agriculture |
| **ARTS** | Artificialized surfaces |
| **BDU** | Beaches and dunes |
| **CAN** | National Environmental Commission (abbreviation in Portuguese) |
| **CNADS** | National Council on the Environment and Sustainable Development (abbreviation in Portuguese) |
| **DGSU** | Directorate-General for Urbanisation Services |
| **ECC** | European Economic Community |
| **EGT** | Evolutionary governance theory |
| **ELC** | European Landscape Convention (now the Council of Europe Landscape Convention) |
| **ESDP** | European Spatial Development Perspective |
| **EU** | European Union |
| **GIS** | Geographical information system |
| **GLF** | Global Landscapes Forum |
| **ICM** | Integrated Coastal Management |
| **ICZM** | Integrated Coastal Zone Management |
| **IGT** | Interactive governance theory |
| **IFLA** | International Federation of Landscape Architects |
| **IPPC** | Intergovernmental Panel on Climate Change |
| **IUCN** | International Union for Conservation of Nature |
| **FAO** | Food and Agriculture Organization of the United Nations |
| **FIS** | Forest of invasive species |
| **FOC** | Forest of other conifers |
| **FOE** | Forest of Eucalyptus |
| **FOH** | Forest of other hardwoods |
| **FOR** | Forest |
| **FPP** | Forest of Pinus pinea |
| **FPPY** | Forest of Pinus pynaster |
| **LBPOTU** | Spatial and Urban Planning Policy Act (abbreviation in Portuguese) |
| **LPN** | Liga para a Protecção da Natureza (abbreviation and its meaning in Portuguese) |
| **LRCZCC** | Landscape Recognition of the Coastal Zone between Caminha and Cortegaça |
| **LULC** | Land use and land cover |
| **NUTS** | Nomenclature of Units for Territorial Statistics |
| **OPE** | Open spaces with little or no vegetation |
| **PCG** | Greenhouses |
| **POOC-CE** | Coastal Zone Management Plan Caminha-Espinho |
| **POC-CE** | Coastal Zone Management Programme Caminha-Espinho |
| **UNESCO** | The United Nations Educational, Scientific and Cultural Organization |
| **USA** | The United States of America |
| **RJIGT** | Legal Framework for Spatial Planning Instruments (abbreviation in Portuguese) |
| **SDG** | Sustainable Development Goals |
| **SRH** | Shrubland |
| **SIARL** | Coastal Resource Administration System (abbreviation in Portuguese) |
| **WAT** | Water |
| **WET** | Wetlands |
| **WWF** | World Wildlife Fund |



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**The Dance**, 1988, Paula Rego. Tate. Purchased 1989. © Paula Rego. Photo: Tate.

# PART I — INTRODUCTION

# 1 Motivation

Our childhood landscape memories, experiences, and feelings are fundamental to understanding who we were and who we are. After graduating, by mere chance, in Landscape Architecture, I realised years later that my childhood landscapes had deeply influenced my decision to become a landscape architect. The vivid memories of vineyards stretching over agricultural fields, the water channels my grandmother often tended, the panoramic views of Viana do Castelo from Santa Luzia Hill, and the picnics in the pine forests by the beach have all profoundly shaped who I am today. Landscape architecture turned out to be my "destiny" (for those who believe in such things).

These are the landscapes of the "garden of Portugal," with their distinctive smells, sounds, and textures (Sant'Anna, 1996[1]), which I call home. They partly motivated me to pursue a degree in landscape architecture. During my studies, I was immediately captivated by landscape planning and management. Toward the end of my degree, I completed an internship at The Northen Region Coordination and Development Commission. Under the guidance of Dr. Graça Fonseca, Prof. Teresa Andresen, and Prof. Maria José Curado, I developed research on the (hypothetical) strategic environmental assessment of the Coastal Zone Management Plan Caminha-Espinho. Years later, I had the opportunity to coordinate and work on the actual (2021) revision of this plan (now a programme), further reinforcing my interest in this field of research.

1 Sant'Anna, D. (1996). Guia de Portugal Vol. IV Tomo 2 - Entre Douro e Minho: I Douro Litoral (Vol. 2). Lisboa: Fundação Calouste Gulbenkian.

Over time, my childhood landscapes have been transformed for various reasons, and some are now in danger of disappearing. This realisation, coupled with a sense of unease and supported by my personal and professional background, led me to focus on coastal landscape governance as the subject of my doctoral thesis.

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# 2 Research context

In this section, I aim to briefly explain the rationale behind the approach to structuring this thesis and to provide insight into the guiding decisions and challenges encountered in this cumulative PhD research project.

First, I would like to clarify why I chose an article-based research format instead of a traditional thesis, a decision supported by my supervisor, Professor Paulo Pinho. This choice reflects my intention to actively engage in scientific discourse throughout the research process. I recognised that this format would not only support my development as an independent researcher but also provide invaluable experience in scientific writing, journal submission, and peer review (both as an author and a reviewer). Additionally, this structure facilitated the progressive dissemination of findings in both scientific literature and international conferences. Each article produced along this journey has contributed independently to the field while collectively advancing the debate on coastal landscape governance.

Second, regarding the structure of this thesis, I would like to explain why we chose this particular format. Nowadays, two main formats are commonly used across Europe to present cumulative theses. The first model involves compiling an extended summary that synthesises the entire thesis, with the produced articles included as appendices. The second model integrates a general introduction, the articles themselves, and a concluding section with a general discussion and main conclusions.

Currently, the Faculty of Engineering at the University of Porto does not have specific regulations for structuring an article-based thesis. After discussing both options with Professor Paulo Pinho, I decided to pursue the article-based format. I selected this approach to allow the articles to serve as the central elements of the thesis. Throughout the development and evolution of the research project, the structure of the thesis was carefully considered. Each of the five articles produced was conceived to create interconnections, linking them into a cohesive narrative that reflects the progression of the research. Each article builds upon the previous one, advancing the research questions and emphasising the continuity of ideas and findings across the thesis.

Although I acknowledge that this format introduces some redundancy, particularly within the introductory sections of each article, these repetitions serve a fundamental purpose. They provide continuity and context for each article as an independent piece while maintaining alignment with the thesis as a whole. I have made every effort to use each article's introduction as an opportunity to advance the overarching discussion, moving the narrative forward rather than merely reiterating past content. This approach enables each article to stand alone while contributing to a unified research story across the thesis.

Thirdly, regarding the outline of this thesis, I chose to present the State of the Art (Section 3) first, followed by the research objectives (Section 4) and research design (Section 5). This decision reflects the fact that, when I began this research, I only had a general topic, coastal landscape governance, without a specific research question or hypothesis. The systematic literature review provided the foundation for the PhD research, enabling me to identify the research problem, research gap, and, consequently, the research questions that guide this study. Additionally, this structure helps reduce redundancy; otherwise, I would have needed to present a summary of key findings from current debates on coastal and landscape governance at this early stage to introduce the research topic.

Fourth, as explained later in Section 3 (State of the Art), an initial search on "coastal landscape governance" yielded no entries on Scopus, leading me to expand the search to include "coastal governance" and "landscape governance" debates. Although this limitation is noted in the article, I wish to clarify further why I chose not to extend the review to include coastal landscape planning and management debates. While I initially considered this expansion, after discussing it with my supervisor, I ultimately set it aside due to time constraints, as it would have been a significantly more demanding task. I therefore concentrated on the most recent discussions, which, today, primarily fall under the concept of "governance".

To gain additional insights, however, I conducted an exploratory search on the Scopus database related to coastal landscape planning and management. The results indicated that the concept of "landscape" is primarily viewed as a scenic element, frequently associated with tourism or the conservation of nature and biodiversity. These findings confirmed my decision to focus on governance discussions, as extending the systematic literature review to include coastal landscape planning and management debates would likely not yield significantly different insights.

Encouragingly, we now have five articles entries on "coastal landscape governance" in the Scopus database. My primary hope, however, is that others recognise the scientific and societal relevance of approaching governance from a landscape perspective, especially within coastal landscapes, but not exclusively.

Fifth, it is worth noting that the concluding article (Section 11), titled "A Manifesto for Coastal Landscape Governance" and outlining several recommendations, was developed before some of the later empirical articles. This sequence reflects the iterative nature of the research process. After completing the State of the Art article, I aimed to clarify the relevance of this research and the changes that should be considered in the field, given current scientific and political debates. The Manifesto was designed to synthesise insights from the literature and provide a forward-looking perspective, offering recommendations that highlight the implications and societal importance of coastal landscape governance. Writing this article at that stage, with the subsequent empirical studies in mind, allowed me to refine and deepen the overall conclusions of the thesis.

Finally, to enhance the coherence of the thesis as a unified document, I made minor adjustments to the section titles in some of the articles, which are noted with footnotes. For example, most articles originally included a "Conclusion" section. However, in order to present this thesis as a cohesive whole, I revised these to "Concluding Remarks", reserving the final conclusions to be drawn after completing all components of the research. Other adjustments are similarly noted throughout the document.

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**Reference**

Gonçalves, C., & Pinho, P. (2022). In search of coastal landscape governance: a review of its conceptualisation, operationalisation and research needs. Sustainability science, 17(5), 2093-2111. doi: https://doi.org/10.1007/s11625-022-01147-6

**Contributions**

CG: Conceptualisation, Writing – original draft, and review & editing, Funding acquisition. PP: Writing – review editing, Supervision, Funding acquisition.



# 3 State of the Art

## In search of coastal landscape governance: a review of its conceptualisation, operationalisation and research needs

## Abstract

Coastal landscapes are spaces and places of conflict, being among the most dynamic and vulnerable environments on the planet. Coastal landscapes are regulated through various policy instruments focused on competing interests and land uses at several intersecting administrative scales. High levels of landscape transformation, partially induced by climate change, can also be observed in several coastal countries. This article presents a systematic literature review, using PRISMA 2020 protocol, focusing on two central and complementary debates: one focuses exclusively on coastal landscape governance (landscape research) and the other on coastal governance (coastal planning research). The systematic conceptualisation of landscape governance has emerged in the last decade, particularly in western countries. Yet, the debate to date mainly focuses on forest landscape restoration in the Global South. There has not been a comprehensive debate focused on the procedural and substantive aspects of coastal landscapes governance. Coastal governance is an emergent challenge that needs to evolve to overcome an

often overstretched and fragmented governance system which has to take into account current societal challenges. Building on 174 peer-reviewed English-language articles, results reveal research trends in the conceptualisation and operationalisation of both types of governance. The review shows that there is a growing awareness of the relevance of coastal governance and landscape governance. However, evidence confirms that a robust conceptualisation and operationalisation of coastal landscape governance is missing. Conclusions point to new directions for coastal landscape governance, highlighting the need to strengthen theoretical and empirical research.

**Keywords**
Socio-ecological systems; Landscape approach; Integrated Coastal Zone Management; Landscape sustainability; Evolutionary Governance Theory; Adaptive governance.

## 3.1 Introduction

Coastal landscapes are spaces and places of conflict, being among the most dynamic and vulnerable environments on the planet. Coastal landscapes are regulated through various policy instruments that focus on competitive land uses and interests at several intersecting administrative scales (Rangel-Buitrago et al., 2018). High levels of coastal landscape transformation can also be observed (Romano & Zullo, 2014), mainly because protecting landscapes of exceptional beauty has only been required in few coastal countries. A recent survey of the state of worldwide's coastal regions demonstrated that anthropogenic pressures are severe and extensive and that "intact coastal regions are now rare" (Williams et al., 2022, p. 6). These findings corroborate a profound loss of biodiversity and landscape services and values with unprecedented environmental, economic, and social challenges ahead.

The overlapping of the different driving forces affecting coastal landscapes, and sectoral policies, instruments, and scales have substantially increased the complexity of governance (Kristensen & Primdahl, 2020). Furthermore, governance challenges are expected to increase considerably in coastal countries with high infrastructure and population concentration due to human-induced climate change. Indeed, the Intergovernmental Panel on Climate Change (IPCC, 2019) estimated that currently, 680 million people live in the low-lying coastal zone and project that this number will increase to one billion by 2050. Even their global conservative sea-level rise projections (IPCC, 2019) are enduring alarming and strongly dependent on the rate of Greenland and Antarctic ice sheet melting (Thomas & Lin, 2020). Sea-level rise, extreme weather events, inundation, and erosion are some of the threats that coastal landscapes are already facing and will intensify soon.

Governance systems must evolve to address the interactions between the system-to-be-governed and the wicked problems ahead, demanding a *"more comprehensive political, social, and institutional reform than simple a symptom treatment"* (Jentoft & Chuenpagdee, 2009, p. 555). Governance systems must acknowledge which coastal landscapes must undergo a planned transformation, a coastal rewilding, or be involuntarily transformed by erosion and inundation processes.

Even though coastal research has become more holistic and interdisciplinary during the last four decades (Birch & Reyes, 2018), landscape research has not contributed significantly to the debate. On the one hand, the concept of governance-penetrated policy and research agendas in coastal planning and management was introduced a long time ago, after the United States Coastal Zone Management Act of 1972 (Fischer, 1990; Scott, 1978). As a result, a wealth of literature from around the globe has been developed on coastal governance processes, structures, and practices (Partelow et al., 2020), yet the attention given to coastal landscapes remains low. Additionally, a fragmented governance structure with high regulatory complexity and a lack of policy integration with inconsistent sea-land interactions to deal with coastal wicked problems remain a key challenge to coastal governance in many coastal countries. On the other hand, a growing awareness of the need for more integrated public policies and planning instruments has resulted in calls for landscape-focused forms of governance, mainly because global challenges do not comply with either fixed administrative boundaries or traditional government-led jurisdictions (Arts et al., 2017b; Van Oosten et al., 2021). Contemporary researchers focus on landscape as a living place, functioning as a dynamic socio-ecological system, depending on how people perceive it and recognising the need for different stakeholders involvement (Swaffield, 2002; Thompson, 2008). The systematic conceptualisation of landscape governance along these lines has only emerged in the last decade after the work of Görg (2007). Since Görg (2007), many scholars have called for renewed efforts towards landscape governance as a new governance prism capable of connecting contemporary global challenges with a place-based, multi-level and multi-stakeholder integrated approach.

This dichotomy between coastal and landscape governance research (coastal planning research versus landscape research) is the starting point for this systematic literature review. Our main goal is to identify potential theoretical and empirical alliances by incorporating the landscape governance lens into coastal governance to advance the coastal landscape governance emerging field. To achieve this, our review will: (1) analyse how the coastal and landscape governance debate has evolved, leading us to (2) assess the main trends and areas of discussion in both debates and (3) identify research gaps to be explored further.

The article is organised into six sections: the first section is this introduction which aims to present the need for and the main goals of this systematic review. The second section gives an overview of this review's search protocol and its limitations. In sections 3 the results of coastal governance and landscape governance conceptualisation and operationalisation are presented. Section 4 presents the review discussion exploring the meaning of the results and how they could move the field of coastal landscape governance forward and, finally, section 5 presents the main conclusions drawn from the review.

A critical aspect is that governance, landscape, and the coastal zone assume different meanings in the literature. In order to avoid misunderstandings, in this systematic review 'governance' refers to "*all processes of governing, whether undertaken by a government, market, or network, (…) whether formal or informal organization, or territory, and whether through laws, norms, power, or language*" (Bevir, 2012, p. 1). 'Landscape' assumes the formal definition presented by the Council of Europe (2000a) on the European Landscape Convention (ELC), which claims that "*landscape is defined as an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*"(article 1). The 'coastal zone' refers to "*the band of dry land and adjacent ocean space (water and submerged land) in which terrestrial processes and land uses directly affect oceanic processes and uses, and vice-versa*" and it is defined at a policy level (Kay and Alder (2005, p. 2) quoting Ketchum (1972)).



## 3.2 Methods

### 3.2.1 Search protocol and sample

The literature review was organised and conducted using the PRISMA 2020 Protocol to meet the objectives. The search protocol was conducted in May 2021 and repeated in October 2021 using SCOPUS. The literature search started using the keywords "coastal landscape governance", "coastal governance", and "landscape governance", but no entries were found regarding "coastal landscape governance". Therefore, a decision was made to broaden the search to include two strings focused on coastal landscapes ("coast* landscape" AND governance OR "coast* landscape governance"' and '"landscape governance" AND coast*). The search was limited to peer-reviewed journal papers and review articles written in English only. The period of the search was "all years" to 2021. In total, 242 records were stored in EndNote X9 software (Table 1).

**Table 1** Number of articles for each search string

| Main Topic | Search | Search string: | Articles |
|---|---|---|---|
| Coastal Landscape Governance | #1 | "coast* landscape" AND governance OR "coast* landscape governance" | 16 |
| | #2 | "landscape governance" AND coast* | 1 |
| | #3 | "landscape governance" | 100 |
| Coastal Governance | #4 | "coast* governance" | 125 |
| **Total** | | | **242** |

All 242 articles were reviewed to confirm that the search criteria were followed (i.e., peer-reviewed scientific articles and English-language). Duplicates and no-access situations were removed, resulting in 225 records.

For each manuscript, preliminary relevance was determined by the title and abstract. If the content seemed to discuss governance processes and/or provide case studies, its complete reference was obtained. The title or abstract should also embrace the concept of holistic landscape when related to landscape governance. Otherwise, such as if the article argues that

landscape was exclusively a land use or has only an ecological perspective, the hit was excluded. Furthermore, articles focused on ocean activities (e.g. fisheries management, overseas mining, coral reefs preservation) or maritime governance were excluded. Even though maritime governance has been identified as one of the critical challenges for the 21st century (Van-Assche et al., 2020), this research is specifically interested in addressing the governance challenges to the interface of land-sea, excluding ocean governance. As a result, the review did not include the maritime spatial planning approach to the governance of seas and oceans, even though the authors recognise its relevance to both processes' interfaces.

In case of doubt, the article was always included. This process resulted in a database with 192 records. Then, the full text of each of the 192 potentially relevant hits was analysed. Here inclusion/exclusion criteria were also used. For an article to be considered relevant, it had to: (1) discuss the concept of coastal or landscape governance; if it just mentioned the concept, the article was excluded; or (2) provide case studies around the globe where the concept has been studied or applied. A total of 174 articles (see appendix 1) fulfilled one of the criteria mentioned above (71,9% of screened articles) and were eligible for further examination. Figure 1 presents the systematic review flow diagram that synthesises the literature search methodology.

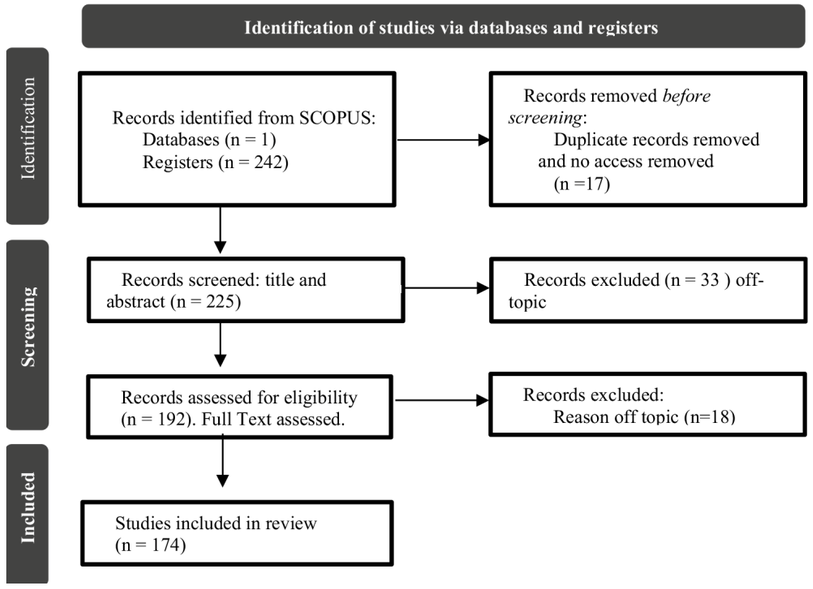


**Figure 1** Synthesis of the literature search methodology based on PRISMA 2020 flow diagram for new systematic reviews



### 3.2.2 Limitations of the literature search

Several decisions were made when conducting the review which entailed associated limitations. Firstly and conceptually, it would have been interesting to consider the evolution of coastal and landscape planning and management to track the changes these theories, concepts, and methods have undergone concerning governance and discuss their main differences and similarities. However, this would need to be a separate assessment. Nevertheless, the 174 articles reviewed were written incorporating and discussing prior research, so indirectly, these complementary developments in the literature are to some extent taken into account.

Secondly, the deliberate exclusion of the search string 'maritime governance' might have led to a different angle on coastal governance being seen. Still, the authors' research only addresses the governance of land-sea interactions.

Thirdly, the search protocol also excludes the search string 'environmental governance' because its wide scope would broaden the results and the analysis too much, yet all articles directly related to landscape or coastal systems were included.

Fourth, grey literature was excluded from the search material because this research aimed to focus exclusively on academic literature. The exclusion of plans, reports and books could lead to some bias, especially in the coastal and landscape governance operationalisation sub-sections. However, it is considered that the 174 reviewed articles are sufficiently to produce a comprehensive understanding of the academic debate on coastal landscape governance.

Finally, the search only included articles written in English, retrievable via Scopus. Nevertheless, most articles (98%) cover many international authors with different scientific backgrounds.

## 3.3 Results

Results on coastal governance (sub section 3.1) and landscape governance (sub-section 3.2) are organised around their conceptualisation and operationalisation. 'Conceptualisation' relates to the abstraction of the concept (coastal or landscape governance) and how it has been conceived, developed, and clarified over time in theory. 'Operationalisation' refers to the procedures developed to represent and apply the concepts in the real world.

### 3.3.1 Results on coastal governance

#### *3.3.1.1 The conceptualisation of coastal governance*

The earliest publication meeting the search's selection criteria appeared in 1978, six years after the Coastal Zone Management Act of 1972 (US Public Law 92-583). Then, only in 2007 is there an evident increase in the number of publications, demonstrating the subject's topicality. The majority of articles (86,2%), from Europe, Oceania, North America, Africa, Asia and South America, explored a concrete governance problem.

In the literature, there seems to be no general definition of coastal governance (Table 2). Pittman and Armitage's (2016) systematic review showed that most researchers do not define it despite using the concept. Nevertheless, the authors identified three implicit trends in the conceptualisation of governance: (1) governance as a context, (2) governance as a praxis and (3) governance as a theory. Governance as a context focuses on structural components (e.g., laws, policies, procedures) and implies that management activities are a part of and strongly influenced by governance (see for instance, Flannery et al. (2015); Fletcher et al. (2014)). Governance as a praxis focuses on the process itself (actors and powers), despite considering the structural components to also be relevant, and its relationship with management is quite unclear (see for instance, Schmidt et al. (2014)). Governance as a theory assumes a set of ideas and hypotheses to be tested, investigated, and revised, and strongly relates to environmental governance (see Partelow et al. (2020); Van-Assche et al. (2020)).

**Table 2** Selected definitions of coastal governance found in the sample (adapted from Pittman and Armitage (2016))

| Definition | Source |
|---|---|
| "... the process by which long-term social goals and the rules and procedures to achieve them are defined. This definition assumes governments, civil society, and markets as the principle source of power by which the processes of governance are expressed." | Pittman and Armitage (2016).<br>Alves et al. (2013), quoting Olsen et al. (2011) |
| "...the formal and informal arrangements, institutions, and mores which determine how resources or an environment are utilised: how problems and opportunities are evaluated and analysed, what behavior is deemed acceptable or forbidden, and what rules and sanctions are applied to affect the pattern of resource and environmental use." | Pittman and Armitage (2016).<br>Christie et al. (2009), quoting Juda (1999) |
| "... the interactions among structures, processes and traditions that determine how power is exercised, how decisions are taken, and how citizens or other stakeholders have their say." | Pittman and Armitage (2016)<br>Cicin-Sain and Belfiore (2005), quoting Graham et al. (2003) |
| "...an interrelated and increasingly integrated system of formal and informal rules, rule-making systems, and actor-networks at all levels of human society (from local to global) that are set up to steer societies towards preventing, mitigating and adapting to global and local environmental change and, in particular, earth system transformation, within the normative context of sustainable development." | Pittman and Armitage (2016)<br>Falaleeva et al. (2011), quoting Biermann et al. (2009) |
| "the interactions among structures, processes and traditions that determine how power and responsibilities are exercised, how decisions are taken, and how citizens and other stakeholders have their say." | Jozaei and Mitchell (2018), quoting Graham et al. (2003) |
| "intentional shaping of the flow of events so as to realise desired public good." | Dale et al. (2016), quoting Parker et al. (2003) |

The coastal governance theory debate mainly focuses on its relationship with environmental governance theories. Recently, Partelow et al. (2020) explored the central claims and abilities of various theories (polycentric, network governance, multi-level governance, collective action, governmentality, adaptive governance, interactive governance theory – IGT - and evolutionary governance theory - EGT), discussing all of them in the context of coastal systems. A key conclusion is that there will never be *a* theory of environmental governance in general or specific for the coast because every theory has its strengths and weaknesses. The authors assert that researchers must understand and use combinatory theoretical frameworks to address coastal governance. Adaptive governance, IGT and EGT were presented as broader combinatory theories, allowing a more comprehensive scope of the multiple factors influencing coastal governance. Partelow et al. (2020) show that adaptive governance has the advantage of focusing on the relationship between the context, change and

resilience, while IGT examines the interdependencies between the territory and the governance system, and EGT gives a co-evolutionary perspective on how different processes have been affecting governance.

On the governance of land-sea interaction, the uncertainty and complexity of climate change effects and the substantial changes in land use in coastal countries leads to most articles tending to reframe coastal governance through the lens of adaptive governance (Schmidt et al., 2014). Adaptive governance aims to reduce uncertainty through iterative and continual learning, and it is often discussed combined with resilience theory (Partelow et al., 2020). Lately, there has been a growing claim to combine adaptive governance with an EGT perspective (Alff, 2020; Schlüter et al., 2020b). EGT understands governance as a process of constant evolution (Van Assche et al., 2014) and "*places governance in the context of socio-ecological systems and which understands governance and governance transformation against the background of co-evolution of all constituent parts of governance: actors, institutions, power, knowledge and narrative*" (Van-Assche et al., 2020, p. 1).

Van-Assche et al. (2020) called for an evolutionary governance perspective to address the specificities of coastal territories, often designated as the 'coastal condition'. The coastal condition requires that the three main challenges for coastal governance must be overcome: (1) the recognition of the coast as an area itself, (2) the complexity of observation in governance between land and sea, and (3) the difficulty of policy coordination and integration on land, at sea and between land and sea. The authors asserts that these three main challenges must be balanced between a global and trans-regional perspective and a local-level governance implementation (Van-Assche et al., 2020), especially in decentralised coastal countries.

Despite the scientific and political debate that coastal territories must be addressed from an integrated perspective, land and sea have generally been regulated separately. Coastal territories have overlapping political/administrative boundaries with different institutions, instruments and actors and observation issues. In a modern coastal country, a specific coastal territory is commonly addressed from three political and/or administrative boundaries (national, regional and local) (Van-Assche et al., 2020), increasing governance complexity to address power relations and interests. The boundaries debate crosses both governances, as a context and as praxis. Schlüter et al. (2020b) highlight that the debate on governance of land-sea interactions remains superficial. Pittman and Armitage (2016) assert that there is still a need to address governance from a social-ecological approach, matching ecological and cultural contexts, boundaries, and scales. Van-Assche et al. (2020) also claim that coastal governance must consider the zone rather than the boundary. The boundary must reflect the coast as a socio-ecological system which entails a local relevance, and the boundaries require multi-level governance between jurisdictions, activities, and elements. This debate gains even more relevance in a climate change scenario. Extreme weather events and sea-level rise are not compatible with coastal zone rigid boundaries (Pittman & Armitage, 2016), reinforcing the existing problems (e.g. erosion, biodiversity loss, pollution).

Multi-level governance is also suggested concerning policy integration. Van-Assche et al. (2020) indicate that a multi-governance structure is necessary. However, it must evolve to acknowledge the interdependencies at the local and regional or national levels and acknowledge the interplay between various policies, instruments, actors, and directions (land-sea). These authors also claim that new forms of policy integration cannot disregard existing forms, and their governance structure must recognise both coast centrality and marginality. The authors highlight that policy integration may reduce the adaptive capacity claiming that "*coastal governance has to observe in all directions, to grasp the interplay between actions, between policies, on land, at sea, at the coast, which all affect the coast. A high degree of coordination is thus required, a high degree of policy integration, while the identities to be coordinated (actors in and outside administrations) shall not and cannot be erased by the process of governing together*" (Van-Assche et al., 2020, p. 6). Coastal governance cannot depend on political cycles and must evolve to allow planning and management to adapt to change (Zafrin & Rosier, 2017). Indeed, the need for empirical evidence of governance systems evolving and changing to become more effective and adaptive is recognised from different geographical contexts (Lane, 2008; Schmidt et al., 2014). Another relevant theme focuses on Indigenous Coastal Management and their adaptation process to sea level rise (Abel et al., 2011). Several authors (Creed et al., 2018; Schmidt et al., 2013) concurred that adaptive coastal governance is constantly changing and evolving. However, Schmidt et al. (2013) assert that there is no particular pathway of progressive adaptation. Histories of cultural meaning and institutional bias can play an essential role in the pathways of adaptive evolution, as was proven in a Portuguese case study. Their research claimed there is a need for progression in adaptive coastal governance supported by scientific knowledge, involvement of local communities and new funding solutions.

Recently, Gonçalves et al. (2021a) also suggested that institutional interplay (i.e., the interaction between institutions) may diminish fragmentation and jurisdictional and functional gaps, enhancing cost-effectiveness. Evidence from

São Paulo Macro Metropolitan Region revealed that a complete overview of institutional interplay must consider environmental conflicts, the coastal and non-coastal institutions across different jurisdictions and sectors, and the informal arrangements that shape the dynamics of the territory (Gonçalves et al., 2021a; Gonçalves et al., 2021b).

Pittman and Armitage (2016) also identified that the debate needs to involve different actors and forms of knowledge cooperating across administrative scales or jurisdictions.

Clarke et al. (2013) and Hofmeester et al. (2012) have also concurred on the benefits of including indigenous knowledge and stakeholders in coastal governance decision-making processes. The debate still focuses on specific types of knowledge (e.g. scientific knowledge) or on parts of the system to be governed (e.g. coastal ecosystems) instead of addressing a holistic perspective to improve ecological and social resources management. Knowledge production for policy-making is also named as a research need for transdisciplinary approaches (Celliers et al., 2021).

Social justice was another relevant theme, gaining more relevance due to climate change (Bennett, 2019; Schmidt et al., 2013). Bennett's (2019) review asserts that coastal governance and management are highly politicised, arguing for political ecology to be engaged in coastal governance. Political ecology provides the theory and methods to engage with questions of power and politics, narratives and knowledge, scale and history, environmental justice and equity. Bennett's (2019) findings draw our attention to the need to re-politicise coastal governance and management and to the potential to expand the application of political ecology. Another relevant argument is that policy frames shape coastal governance processes, influencing how actors see the problem, the solution, and the approaches (Aukes et al., 2020). Carpenter et al. (2018) highlight that Public Perception Research is also a relatively unexplored dimension of coastal governance, resulting in a lack of understanding of the different uses and expectations.

#### *3.3.1.2 The operationalisation of coastal governance*

Pittman and Armitage (2016, p. 9) claim that "*governance is distinct from, but not exclusive of, management*". Management strategies are an essential function of governance because it represents a constant interaction between the system to be governed and governance itself.

The systematic review provided by Pittman and Armitage (2016) shows that three management approaches are relevant to addressing the coastal zone: integrated management, ecosystem-based management, and land-sea conservation planning. However, the authors reflect on an evident fragmentation between the different communities of researchers working on the different management approaches, reinforcing the need for more transdisciplinary contacts between scientific disciplines.

Integrated Coastal Zone Management (ICZM), or Integrated Coastal Management (ICM), is the most politicised approach, mainly in the Global North, but not exclusively so. It has been developed as an alternative to traditional ad-hoc and sector-based approaches that have been advocated since 1950 (Glaeser et al., 2009). After the 1970s, increased levels of environmental awareness and the consciousness that responding to an immediate crisis was no longer the solution led to a demand for new approaches that would address the complexity of the coast. The approach explicitly tried to address coastal zones as unities, aiming for new forms of policy integration addressing both land and sea and striving for the sustainable use of coastal areas (Tabet & Fanning, 2012). Glaeser et al. (2009) mentioned that ICZM is closely linked to a view of coasts as complex socio-ecological systems.

ICZM arose after the Rio de Janeiro United Nations Earth Summit (1992). The coastal States present at the event acknowledged the need to develop integrated strategies, recognising that sustainable development should assume an integrated approach for facing future challenges (Cicin-Sain & Knecht, 1993). One of the most prominent characteristics of ICZM is the integration across sectors, disciplines, institutions and levels of government (Olsen, 2002). As a result, ICZM has been gradually accepted as a holistic approach for coastal planning and management (Wescott, 2004), with numerous countries developing ICZM policies (Caviedes et al., 2020; Lee, 1998; O'Hagan & Ballinger, 2009; Rosendo et al., 2018). Several initiatives followed at the European Union level to stimulate ICZM implementation in its Member States (Van-Assche et al., 2020), reinforcing the EUropeanisation of national policies.

Different academic assessments followed (Fletcher et al., 2014; Khelil et al., 2019; Martino, 2016; Soriani et al., 2015). However, as Glaeser et al. (2009) point out, "*ICZM is characterised by a growing gap between rhetoric and practical reality at both local and global level*". The concept and the success of ICZM relied on the capacity to

promote integration between different policies, respond adaptively to political and societal changes, engage citizens in the decision-making process and plan against the dominant power structures (Post & Lundin, 1996; Tabet & Fanning, 2012). Several authors (Olsen, 2002; Tabet & Fanning, 2012; Van-Assche et al., 2020) concluded that this approach has failed to tackle the coast as a particular zone and that actors and knowledge were also focusing on land or sea. In addition, policy integration was rarely achieved because of a lack in understanding of the coastal condition, weak governance structures and capabilities, or financial constraints. Van-Assche et al. (2020) claimed that ICZM must evolve under the lens of EGT to move forward in the direction of adaptive coastal governance.

Ecosystem-based management has also gained a relevant position in the ongoing debate (Pittman & Armitage, 2016), mainly linked to the ecosystem services concept (McKinley et al., 2018). Literature advocates that new management paradigms based on ecosystems must "*acknowledge the multiple connections sustaining and distinguishing an ecosystem, including values and services provided by such ecosystem, the accumulated impacts and risks, the multiple and often competing management objectives, as well as need to embrace change and foster social learning and adaptation from wide scale strategies to local contexts*" (see the Introduction of Herbst et al., 2020). Chen et al. (2020) research claims that ecosystem accounting through the lens of evolutionary governance has the potential to enhance transparency, clarify material dependencies and link stocks and flows of ecosystem' services and values.

Based on Álvarez-Romero et al. (2011), Pittman and Armitage (2016) stated that land-sea conservation planning correlates ecosystem-based management with integrated management. Nevertheless, its principal distinction is its focus on addressing fundamental systematic conservation planning concepts such as complementarity, least-cost solutions, transparency, and repeatable methods.

Over time, other concepts have emerged that indicate shifts in coastal governance to address the complex interactions within coastal systems. Climate change and risk mitigation and adaptation are one theme that is gaining increasing attention in coastal governance literature (Dunning, 2020; Glaser et al., 2018; Hofmeester et al., 2012; O'Riordan et al., 2014; Sauer et al., 2021). Rosendo et al. (2018) showed the need for closer integration among coastal management, disaster management and climate adaptation frameworks. O'Donnell (2019) explored the complexities of local planning policies in addressing coastal climate adaptation. Findings revealed that the most significant obstacles to climate adaptation are the possibility of having different interpretations of the same laws, inconsistencies between various legal frameworks and the prevalence of private property ideology. The urgency of governments to assume an integrated perspective, especially creating institutions that deal with the complexity of the coastal system, is also asserted (Bellanger et al., 2020; Caviedes et al., 2020). Sauer et al. (2021) demonstrated the need to articulate national policy decisions with local initiatives to foster coastal climate adaptation in the Barcelona metropolitan area to overcome how climate change adaptation is mainstreamed at different scales and sectors.

Finally, others (Jozaei & Mitchell, 2018; Jozaei et al., 2020) have argued that coastal governance needs to incorporate the resilience thinking approach to address the complexity and future uncertainty of changing scenarios. The resilience thinking approach is often linked to adaptive management (Dunning, 2020). Jozaei et al.'s (2020) empirical findings suggest that the resilience thinking approach is also effective in dealing with scale issues in the decision-making process and is compatible with proactive and entrepreneurial leadership.

#### *3.3.1.3 Main findings on the coastal governance results*

Since 1950, coastal planning and management have been standing as an integrative discipline. However, only in 2007 would there be a significant increase in the number of related publications. The debate focuses predominantly on Europe, Oceania and North America, and it is strongly associated with coastal management.

The discussion has mainly centred on three complementary perspectives: governance as context, as praxis, and as theory (Pittman & Armitage, 2016). Coastal governance as a theory relates to abstraction of the concept and has evolved with close links to environmental governance theories. The synergies between different theories are asserted to address coastal societal challenges (Partelow et al., 2020), yet adaptive governance dominates the debate, mainly due to climate change adaptation and mitigation. Adaptive governance focuses on the context, change, learning, and monitoring process and relates to resilience theory to reduce uncertainty (Schmidt et al., 2013). Recently, EGT is also discussed as a broader theory that places governance in the context of socio-ecological systems and highlights the co-evolutionary perspective on how processes have been affecting governance, informing future governance options (Schlüter et al., 2020b).

Van Assche et al. (2020b) identified the three main challenges that coastal governance must address and overcome now: 1) coastal zones must be politically recognised from a socio-ecological perspective, 2) governance must address the interface between land and sea, and 3) policy integration and coordination must be accomplished.

The debate has also been addressing the structural (governance as a context) and process (governance as a praxis) components of governance, respectively, to better deal with coastal challenges. However, the debate has centred chiefly on the operationalisation of management approaches. ICZM gained a strong position after Rio 92 and aimed to address the complexity of the coastal zone from an integrated perspective. Worldwide, coastal states assumed the commitment of developing sustainable coastal policies, delivering policy integration, and addressing this dynamic ecosystem as a biophysical functional unit, tackling the interface between land and sea. At that time, ICZM governance's challenges focused on approaching the coastal zone from an integrated perspective, addressing the interface between land and sea, and ensuring policy integration and coordination. Indeed, several academic assessments of ICZM policies across different geographical perspectives showed the difficulties of addressing the coast from a holistic perspective. There was a lack of understanding of the coastal condition or reduced governance structures, management capabilities or limited financial resources available (Fletcher et al., 2014; Khelil et al., 2019; Martino, 2016; Soriani et al., 2015). Despite the demand for decentralised governance, there is no consensus on which institutions, instruments, and actors must be considered.

Climate change and biodiversity loss associated with global geopolitical discourses have led to significant shifts in addressing coastal governance. Ecosystem-based management linked to the ecosystem services debate has gained a relevant position in the ongoing discussions to address the complexity and uncertainty of coastal territories (McKinley et al., 2018; Pittman & Armitage, 2016). On a separate note, Van-Assche et al. (2020) claim that ICZM must address socio-ecological systems and EGT theories to evolve into adaptive coastal governance.

Social justice, political ecology, and public perception are also underdeveloped research themes pointed out as necessary to the strengthening of coastal governance theory and practice.



### 3.3.2 Results on landscape governance

#### *3.3.2.1 The conceptualisation of landscape governance*

In the literature, there seem to be varied definitions of landscape governance (Table 3). Kusters et al. (2020) argue that its meaning is not yet coherent even though the concept has spread since 2007 into academia, politics, and practice. Leibenath and Lintz (2018, p. 476) have also recognised that the concept is a "*king of 'meta boundary objects"* because it is constituted of two boundary concepts that have given rise to much philosophical debate between different scientific disciplines. Mansourian and Sgard (2021) discussed the diverse interpretations and applications of 'governance' concerning forest landscape restoration, highlighting that landscape governance faces higher complexity because of the multiple interpretations of the concept of 'landscape' itself when compared with environmental governance.

**Table 3** Definitions of landscape governance found in the literature (Source: own compilation)

| Definition | Source |
|---|---|
| "...deals with the interconnections between socially constructed spaces (the politics of scale) and 'natural' conditions of places". | Görg (2007, p. 954) |
| "...to refer to the actual multi-sector and multi-actor interactions at landscape level aimed at "solving societal problems and creating societal opportunities"". | Ros-Tonen et al. (2014, p. 2997) based on Kooiman and Bavinck (2013) |
| "...concerned with the institutional arrangements, decision-making processes, policy instruments and underlying values in<br><br>the system by which multiple actors pursue their interests in sustainable food production, biodiversity and ecosystem service conservation and livelihood security in multi-functional landscapes". | Kusters et al. (2020, p. 2) quoting Kozar et al. (2014) |
| "...the process of multi-sector, multi-actor and multi-level interaction and decision making at the landscape level." | Van Oosten et al. (2018a, p. 157) based on Colfer and Pfund (2011), Van Oosten et al. (2014), Ros-Tonen et al. (2015) and Kusters (2015) |
| "...a place-based multi-stakeholder process of negotiation and spatial decision-making within its wider institutional context, with the aim of maintaining, enhancing or restoring the landscape's functions, goods and services for the long term". | Van Oosten et al. (2021, p. 1) based on Van Oosten et al. (2014) |

Indeed, researchers recognise that landscape governance evolves from environmental governance and that there is a relationship in particular with environmental policy integration (EPI) (Van Oosten et al., 2018b). However, it is argued that landscape governance complexity is higher than EPI "*as it cuts across boundaries of sectors and scales*", especially in countries that do not follow the socio-ecological processes of landscapes when defining their boundaries (Van Oosten et al., 2018b, p. 63).

Despite the relation between landscape and environmental governance, Leibenath and Lintz (2018) criticise that the literature, in general, is still failing in researching the relationship with other instruments and systems of governance. However, the authors recognise that Visseren-Hamakers (2015) counters this trend, analysing and discussing different concepts and approaches, looking for synergies to enhance governance to deal with complexity and fragmentation.

Although the body of literature on landscape governance is still relatively small, some common trends have arisen. Leibenath and Lintz (2018) identified two lines of conceptualising landscape governance and proposed a third one. The first followed the Görg (2007) work, the second the ideas of Kozar et al. (2014), and the proposed third line was based on Arts and Visseren-Hamdkers (2012) Triple G model (government, governance in the narrow sense and governmentality) used to analyse the forest policy field in depth. One common point in the debate is that Görg's article (2007) is identified as the starting point of systematic discussions about landscape governance, aiming to discuss the advantages of the 'landscape' concept to move forward environmental governance spatialisation in Germany. Since then, researchers worldwide have increased their interest in addressing landscape governance from a conceptual and/or empirical perspective, mainly in Europe, Africa, and Asia. Kozar et al.'s (2014) argument dominates the literature. It is centred on the governance process itself and its instruments. It has mainly been discussed in the sense of 'good governance, emphasising the "*plurality and interdependency of actors, institutions and modes of landscape-related public policy-making*" (Leibenath & Lintz, 2018, p. 478). Many authors (Kusters et al., 2020; Van Oosten et al., 2021) have conducted empirical research to analyse the multi-level, multi-actors, and multi-sectoral approaches to collective decision-making in different geographical contexts in the Global North and South.

More recently, Leibenath and Lintz (2018) claim that, despite the fact that landscape governance has gained prominence in the literature, it still has distinct meanings. Additionally, the authors criticise that both trends (Görg (2007) and Kozar et al. (2014)) conceptualise landscape governance as a unifying political decision-making concept, describing it as a utopian concept, where conflicts of interests are not explicitly considered as being part of landscapes. Using Germany's wind energy landscape to demonstrate it, Leibenath and Lintz (2018) challenge both Görg (2007) and Kozar et al.'s (2014) perspectives, proposing that landscape governance must be approached using three theoretical perspectives when analysing theories and empirical manifestations of landscape governance: government, governance in the narrow sense and governmentality. Although those perspectives have different epistemological assumptions, leading to different approaches to reality, their juxtaposition may strengthen the findings, leading to a more accurate perspective of power relations and effects. In 2015, Plieninger et al. (2015) also recognised the need to address environmental justice in European landscape research regarding power relations in landscape stewardship.

Power relations are also present in Görg (2007) research, yet it is not a central theme. The author's argument comprises three critical areas as conceptualising the nature of landscape governance: 1) the relationship between the politics of scale and the natural conditions of a place, (2) the emergence of public-private actors' constellations, and (3) the policy responses. It is claimed that 'landscape' is a bridging concept that operates at different scales, representing biophysical, ecological and social scales, following the ideal stated on the ELC (Council of Europe, 2000a). Nevertheless, the fuzziness of the spatial scale for governance also creates different tensions and power relations (who is in or out). At the same time, it handles complex environmental and social problems fixed in a specific place with particular biophysical conditions which may yet have a global impact (Van Oosten et al., 2018a).

Furthermore, landscape governance entails a medium-large temporal scale that can represent a challenge when dealing with socio-ecological systems. The interactions between the different components and stakeholders can operate at many scales that transcend political-administrative boundaries. These '*new spatialities*' (Görg, 2007) may lead to new functional spaces that may not have the legitimacy to operate. Moreover, as Van Oosten et al. (2021) demonstrated, actors in the Netherlands, Indonesia, Ethiopia, Nepal, Brazil, Rwanda and the Philippines may not have the substantive or procedural capabilities to address the '*new spatialities*' and their governance challenges.

Landscape governance boundaries assume distinct debates beyond the '*new spatialities*', mainly related to property rights (Mansourian & Sgard, 2021; Penker, 2009). Virtual parcelling has been recently discussed by Bradshaw and Leonard (2020) in The United States of America as a possible solution to overcoming landscape governance conflicts when dealing with overlapping resources, varied ownerships and governance structures.

Although Gorg's (2007) main argument focuses on the relationship between the politics of scale and the natural conditions of a place, Leibenath and Lintz (2018) criticise the fact that the natural conditions of a place are also socially constructed. The fact that Görg (2007) emphasises the politics of scale, the neglection of the broader conceptualisation of landscape governance is also discussed. Indeed, Buizer et al. (2016) criticised the fact that the natural conditions must have an active and relational conceptualisation. Their main arguments were that the natural conditions are dynamic and that the dominant discourses and institutional practices can affect it, as was demonstrated in a Dutch agricultural landscapes case study. Nevertheless, Van Oosten et al. (2018a, p. 159), when researching large-scale commodity landscapes in Indonesia, also claimed that "*the spatialisation of landscape governance requires not only new actor constellations, but also new discourses and institutional reform*". In decentralized democratic countries, a '*new institutionality*' is necessary to deal with landscape governance complexity, allowing public-private institutional arrangements to operate.

Another relevant distinction in the debate is introduced by Van Oosten et al. (2021). The authors discussed the differences between substantive and procedural landscape governance. The first dimension focuses on the system to be governed, aiming to maintain, enhance or restore landscape's functions, goods, and the services it provides. The second dimension looks for the governance process, seeking to enhance a legitimate place-based stakeholder process of spatial decision-making (Mansourian & Sgard, 2021; Van Oosten et al., 2014; Van Oosten et al., 2021). Both have a robust institutional component. Substantive landscape regulates landscape functions through different policy sectors and instruments, mainly on a sector-based perspective and at higher administrative levels of scale. Procedural landscape governance occurs across sectors, scales and jurisdictions with formal and/or informal institutional arrangements (Van Oosten et al., 2021). In 2018, Van Oosten et al.'s (2018b) research also addressed policy conflicts in Rwanda through the substantive and procedural lens. The first is linked to conflicting policy objectives, while the second is associated with the absence of transparency and/or participatory procedures. Results showed that productive[2] bricolage, institutional bricolage[3] and institutional entrepreneurship[4] were essential for actors to address conflicting policies on landscape governance processes. Stepanova and Bruckmeier (2013) have also discussed the fact that Swedish coastal governance conflicts were mainly related to the juxtaposition of different actors representing distinct institutions with conflicting interests and perceptions.

In addition to landscape governance conflicts, other challenges have been discussed concerning landscape governance. The debate highlights the need to leave the prominent (European) 'landscape elitism' where the protection and management of the landscape are only shaped through the values of professional elites, demanding new modes of governance (Scott, 2011). The fact that operationalisation must occur at the local level to be more effective is underlined because the bottom-up process for policy integration on this scale opposes established discourse, empowers institutions and produces alternatives to the business-as-usual mindset (Buizer et al., 2016). Opdam et al. (2016) review on the assumption that landscape benefits impact collective action in its governance proves that more systematic and critical empirical research still needs to be conducted. Westerink et al. (2017) likewise demonstrated that introducing landscape services as a boundary concept in landscape governance in a rural case study in the Netherlands helped bridge social boundaries and enhanced social capital. Visseren-Hamakers (2015) have also emphasised the importance of debating the complexity of integrating landscape concerns into other policies compared with integration within the landscape governance system. Beunen and Opdam (2011) also discuss the need to improve the science-policy integration in European landscape research to improve local landscape governance models. Recently, Ciftcioglu (2019) research concluded that Cyprus' coastal landscape governance was unsuccessful due to a lack of integration of traditional knowledge with scientific knowledge and that planning policies still ignored landscape protection and management.

2 Productive bricolage refers to the "*flexible and dynamic crafting together of various livelihood options and its associated impacts on the landscape*" (Van Oosten et al., 2018b, p.159)

3 Institutional bricolage refers to "*refers to the dynamic and ad hoc flexible nature of the governance process in the form of (re)constructing institutions, pieced together by individuals acting within the bounds of circumstantial constrains*" (Van Oosten et al., 2018b, p.159)

4 Institutional entrepreneurship refers to a deliberate process "*to manoeuvring between sectors and scales, and to building policy networks in between" (Van Oosten et al., 2021, p. 5)*

#### *3.3.2.2 The operationalisation of landscape governance*

Despite the diverse conceptualisations of landscape governance, results showed that research demands more effective and holistic approaches closely linked to landscape management (García-Martín et al., 2016; Shuttleworth, 2017; Wu, 2021) and landscape sustainability (Riggs et al., 2021). Scholars have advocated that landscape governance requires integrated landscape approaches to improve landscape quality and successfully support transitions towards sustainable landscape change (Albert & Vargas-Moreno, 2010; Arts et al., 2017b).

The debate focuses mainly on forest landscape restoration in the Global South (Bastos Lima & Persson, 2020; Elbakidze et al., 2010; Riggs et al., 2018). However, other examples include natural resource management in Ghana and Burkina Faso (Foli et al., 2018), conservation and sustainable development in Ghana, Malawi, South Africa and Benin/Togo (Hedden-Dunkhorst & Schmitt, 2020), rural change in Denmark (Kristensen & Primdahl, 2020) and adaptation to climate change in Cameroon (Brown, 2018).

Integrated landscape approaches are not 'new'. However, these approaches have become a driving paradigm in the international environmental realm during the last decade, mainly in the Global South, especially after Sayer et al. (2013). Ros-Tonen et al. (2014) recognise that landscape governance is still '*experimental*' while integrated approaches have a long tradition, particularly after the 1992 Rio Summit. Integrated landscape approaches are considered the 'next generation of integrated approaches' because such approaches aim to conciliate conservation and development at the landscape scale, based on the premise that trade-offs must be identified, negotiated and accounted for, because, in any planning situation, there will be winners and losers (Reed et al., 2020).

Landscape approaches are usually created when developing countries need to conserve the most critical local resources (Arts et al., 2017b). Sayer et al. (2013) proposed ten design principles for an integrated landscape approach (1. learning and adaptive management; 2. building on common concerns; 3. recognition of influences from multiple scales; 4. multifunctionality, requiring choices and trade-offs; 5. strong stakeholder engagement; 6. negotiated and transparent change logic; 7. clarification of rights and responsibilities; 8. participatory monitoring; 9. building system-wide resilience; 10. strong capabilities of all stakeholders involved) to bring together competing land uses, highlighting the need for adaptive management, stakeholder involvement and multiple objectives. The authors also identified weak governance and institutional failure as the critical implementation aspects. A landscape approach requires collaborative participation, transdisciplinary/cross-sectoral approaches, managing adaptive capacity, and applying an iterative process to address the system's inherent complexity (Arts et al., 2017b). The advantages of using participatory tools to increase stakeholders' involvement have also been researched (Best et al., 2021; Ros-Tonen et al., 2021). Van Oosten et al. (2021) add that landscape approaches and landscape governance, mainly when focusing on landscape restoration, must be legitimate on the participation of the stakeholders involved (input legitimacy), the efficacy of the outcome policy (output legitimacy) and the way that the process is performed (through legitimacy).

Focusing on adaptive landscape approaches, Ros-Tonen et al. (2014) conducted a review tracking its evolution from co-management strategies and applying it to a reforestation landscape in Ghana. The authors concluded that five design principles (integrated approach, multi-stakeholder negotiation, polycentric governance, continual learning and adaptive capacity) and three enabling conditions (social capital, bridging organisations and long-term funding) must be present to achieve a truly adaptive landscape approach.

Within Europe, as one of the European research project HERCULES' conclusions, Shuttleworth (2017) claims that landscape approaches reflect the governance concept arising from the ELC. Additionally, at the European level, landscape approaches represent an opportunity to apply the Convention principles on the ground and an opportunity for environmental governance implementation.

However, Ros-Tonen et al. (2018) underline that landscape approaches were not designed to contribute to the landscape governance debate. Yet, due to their synergies, they have been identified and discussed for operationalising landscape governance. A recent literature review on integrated landscape approaches in the tropics highlights its proximity to the governance process, conceptualising it as a governance strategy to achieve multi-functional and sustainable landscapes due to engagement with multiple stakeholders, and trade-off identification at the landscape scale (Reed et al., 2020).

Lastly, Ros-Tonen et al. (2018) also claim that landscape approaches are still like a jellyfish because several scholars have different interpretations despite their growing attention on the debate, reflecting the need to advance conceptual and empirical research on different geographical contexts.

#### *3.3.2.3 Main findings on the landscape governance results*

Due to the general decentralisation of government powers in democratic countries and the increased involvement of new actor constellations (Beunen & Opdam, 2011), landscape governance has been discussed in the literature as environmental governance spatialisation (Van Oosten et al., 2018b; Visseren-Hamakers, 2015), which immediately evokes the concept of territorial governance.

The concept of 'landscape governance' was only introduced in 2007, after Görg (2007). Since then, the debate has been growing from a conceptual and/or empirical perspective, mainly in Europe, Africa, and Asia. Research predominantly addresses landscape restoration, especially reforestation in the Global South, yet other examples can be found worldwide.

The meaning of 'landscape governance' is still not stabilised. It is recent, and it involves two boundary concepts. Two trends dominate the debate regarding its conceptualisation (Leibenath & Lintz, 2018). The first trend claims the need to reconnect governance with the politics of scale and the natural conditions of places (Görg, 2007). The second dominates the literature and assesses landscape governance structures and processes (Kozar et al., 2014). Both perspectives are criticised by Leibenath and Lintz (2018) for idealising it as a utopia, where conflicts of interests and power relations are not explicitly analysed. To overcome this criticism, Leibenath and Lintz (2018) propose to address landscape governance from the perspective of government, governance in the narrow sense and governmentality. This perspective can be identified as a third way of addressing the conceptualisation of landscape governance, yet it is still in its infancy.

Recently, another relevant contribution has been made by Van Oosten et al. (2021), discussing the differences between substantive and procedural landscape governance. The substantive perspective focuses on the effects of governance on the character of landscape, while procedural landscape governance addresses the governance process and its legitimacy.

The contemporary debate of defining landscape as a socio-ecological system has reinforced its role as a bridging concept between disciplines that occurs at multi-spatial and temporal scales, offering significant advantages for governance processes. Landscape's multi-scales for intervention, potential for integrating natural and cultural entities as well as tangible and intangible elements and capacity to offer common ground to various sectors and stakeholders in multi-level interaction are common characteristics discussed in the literature.



However, a common challenge identified is landscape boundaries, as the biophysical, cultural and functional spaces may have different interpretations and not have the necessary legitimacy to operate (Görg, 2007; Van Oosten et al., 2021). Landscape conflicts (Stepanova & Bruckmeier, 2013), benefits (Opdam et al., 2016) and services (Westerink et al., 2017) are also relevant themes on which the debate must evolve concerning landscape governance. The debate must also address the environmental justice research deeper (Plieninger et al., 2015) and improve the science-practice-policy integration (Beunen & Opdam, 2011).

Landscape governance can operate at multiple scales, increasing the awareness of higher or lower-level processes. However, the existing institutional rigidity and the competing interests demand new approaches to deal with its complexity and towards sustainable and multi-functional landscapes. Landscape governance is strictly related to landscape management. Integrated landscape approaches dominate landscape governance operationalisation due to their synergies (Reed et al., 2020). The debate has mainly been focusing on developing countries to conserve the most critical local resources and implement landscape restoration plans or projects (Arts et al., 2017b). Several international institutions (e.g., FAO, IUCN, GLF, WWF) have also been advocating its relevance to meet societal challenges. Within Europe, integrated landscape approaches can also represent a relevant instrument to the ELC implementation (Shuttleworth, 2017), yet more research is needed. Landscape approaches represent a governance strategy to address competing objectives and stakeholders, working through a transparent and legitimate process to co-produce a landscape plan, strategy, or project with greater incorporation of plural views in the decision-making process. Working at the landscape scale and identifying trade-offs and synergies contributes to discussing the tensions between development and conservation, identifying and safeguarding landscape unique values and identity. Integrated landscape approaches can promote democratic changes leading to more equal and fairer spaces and places.

## 3.4 Discussion on moving the emerging field of coastal landscape governance forward

A systematic literature review was conducted to assess the state of play and identify the research needs of two central and complementary debates

between coastal governance and landscape governance. It was found that 'coastal landscape governance', the likely bridge between the aforementioned debates, has so far no entries in the SCOPUS database when applying the search protocol (Section 2). In addition, papers on coastal and landscape governance scarcely focus on coastal landscapes. This section compares the results of coastal governance (section 3) and landscape governance (section 4) in order to propose new directions for coastal landscape governance research.

The review demonstrated that the coastal governance debate could be traced back to 1978 (Scott, 1978), but substantial growth in literature on this topic only took place after 2007. Coastal governance has predominantly discussed case studies from Europe, Oceania and North America linked to coastal management. In contrast, we found that landscape governance was only introduced in 2007 (Görg, 2007) and that the discussion has mainly focused on landscape restoration in some European, African and Asian countries. Both debates recognise the need to overcome overloaded and disintegrated governance systems (Kristensen & Primdahl, 2020) to deal with high levels of unstainable landscape or land-use changes. These tendencies reflect the 'governance' debate, which has penetrated policy and research agendas worldwide and has been growing since the 1990s.

Regarding the geographical context, coastal planning and management research has been strongly influenced by the Global North's perspective, with case studies in the United Kingdom, Australia, USA, Canada and Germany leading the coastal governance debate. Although landscape research has mainly been discussed in a Global North context for a long time, the debate has expanded to the Global South to (re)frame theory and empirical research. In addition, and explicitly addressing landscape governance research, several international institutions (FAO, IUCN) have played a crucial role in politicizing the benefits governance at the landscape scale can bring to the process and to the landscape itself due to the consideration of the specific biophysical, cultural, institutional and political context. This, coupled with the fact that most African and Asian countries are leading processes to decrease their deforestation through landscape restoration and including sustainable practices on the ground, justifies most case studies focusing on this geographical context.

These results reflect the need to increase empirical research on coastal governance also from the Global South. Another evident and imperative finding is a need for theoretical and empirical research on coastal landscape governance. Coastal landscapes are one of the most dynamic and vulnerable landscapes on the planet, and research is not giving them the necessary focus to overcome the societal challenges ahead. Landscape governance must infiltrate coastal governance research.

This review showed that coastal governance and landscape governance have no consensual definition at the time of writing (Kusters et al., 2020; Pittman & Armitage, 2016). As they stand today, the coast, landscape and governance are assumed as boundary concepts, the fuzziness of which contributes to their multiple meanings, with different disciplinary perspectives on their background. Despite its inherent inconsistency, the literature recognises the advantages of boundary concepts to facilitate communication and cooperation between different areas of knowledge, highlighting the need for trans-disciplinary research on landscape and coastal governance.

A common trend that our review demonstrated is that currently, the debate recognizes that the coast and the landscape are socio-ecological systems that must be governed as such and that their governance structure must be developed to address societal challenges based on this assumption (Opdam et al., 2016; Pittman & Armitage, 2016; Schlüter et al., 2020b; Van Assche et al., 2020b).

In the landscape governance debate, the concept of landscape itself is also discussed as a potential advantage for governance as it calls for multi-spatial and multi-temporal scales, integrating natural, cultural, tangible and intangible elements, therefore facilitating the effective engagement of stakeholders. The landscape concept can benefit the challenges faced in coastal governance by recognising the coast from a socio-ecological perspective and addressing the interface between land and sea (Van Assche et al., 2020b). Coastal landscape characterisation and delimitation is based on its identity (Stobbelaar & Pedroli, 2011), which also contributes to addressing the complexity of socio-ecological systems. The fact that landscape boundaries may also have different interpretations and may not have the political or administrative legitimacy to operate (Van Oosten et al., 2021) can be criticised. However, a landscape perspective allows greater incorporation of plural views of nature in the decision-making process, envisioning alternative futures in line with the aspirations of citizens, indigenous peoples, and local communities, which can legitimate the process and the outcome. Further research on coastal landscape character is necessary to identify the most relevant values that must be safeguarded in coastal landscape governance.

As our systematic review showed, coastal and landscape governance are based on environmental governance theories (Partelow et al., 2020; Visseren-Hamakers, 2015). However, landscape governance is claimed as the spatial dimension of environmental governance in general and environmental policy integration in particular (Van Oosten et al., 2018a). These findings strengthen the role that landscape governance can add to coastal governance introducing a spatial dimension to it, which means that space, place and scale can be incorporated into this body of research. Coastal landscape governance must address how the coastal landscape specificities have been shaping its governance structure while assessing if its specificities have been safeguarded over time by the governance in place.

Both debates also recognise that there is a need for greater integration and synergies between different governance theories. Adaptive governance dominates the coastal governance debate, mainly related to the awareness of climate change worldwide (Schmidt et al., 2013). Learning and monitoring are essential characteristics of an adaptive process, which must be addressed in coastal landscape governance research, especially in researching for indicators to assess its adaptability.

A recent contribution was made by Van Assche et al. (2020b), calling for an evolutionary governance perspective to address the coastal system. The authors place governance in the context of socio-ecological systems, claiming that an evolutionary perspective reinforces the adaptive capabilities of the governance system. To our knowledge, landscape governance does not address evolutionary governance theory yet. However, the assessment of the co-evolution of actors, institutions, power, knowledge and narrative can also benefit the landscape governance debate. Our review also concluded that there is a need to develop empirical evidence on the evolutionary path of coastal landscape systems, analysing the performance of combined instruments on the system to be governed and on the governance process.

Another gap that our review identifies is the relationship of the debate with territorial governance. Territorial governance policies and research conceptualisation and operationalisation have influenced spatial planning throughout Europe (Van Well & Schmitt, 2015). Considering the overlapping governance structures, the coastal landscape governance debate must build on these three dimensions: the landscape, the coast, and the territory. The current debate addresses policy integration of landscape and planning instruments in coastal territories (Colavitti et al., 2021; Magaudda et al., 2021), but a truly integrative perspective is still missing.

Additionally, indigenous perspectives, values, knowledge, and aspirations on their coastal landscape governance and the impacts of climate change on their communities (Cisneros-Montemayor & Ota, 2019) are also missing from the debate.

Findings also showed that different trends relating to coastal and landscape governance conceptualisation could be identified. The systematic review provided by Pittman and Armitage (2016) concluded that three trends could be identified in the coastal governance debate: governance as a theory, as a context, and as a praxis. Regarding landscape governance, one trend follows Görg's conceptualisation (Görg (2007), and the second the work of Kozar et al. (2014), mainly linked to the concept of 'good governance'. Leibenath and Lintz (2018) stated that power relations must be central to landscape governance and propose a new lens through which it should be seen, mainly claiming the need to combine three different perspectives: the government, the governance in the narrow sense, and the governmentality. Van Oosten et al. (2021) made a recent and relevant contribution to the debate, which advances Görg (2007) work. According to Van Oosten et al. (2021), landscape governance is divided into substantive and procedural landscape governance. Findings demonstrate that landscape governance is mainly concerned with substantive and procedural governance components and power relations, while coastal governance research focuses on procedural (praxis and context) components. It is imperative that coastal landscape governance evolves based on both perspectives as the process and the stakeholders involved influence the landscape functions, goods and services. However, inversely, landscape character must influence its governance process too. Further research must also be conducted comparing different institutions, instruments and actors involved in coastal landscape governance.

Despite governance and management are not synonymous, "one function of governance is to make decisions regarding management" (Pittman & Armitage, 2016, p. 10). Governance covers the collaboration of government and non-government actors, emphasising rules, processes, theories, values, institutions, actors, discourses through which societies make decisions that affect coastal landscapes. Management covers decisions to achieve specific outcomes. Management strategies are an essential function of governance because they represent a constant interaction between the system to be governed and governance itself (Kooiman et al., 2005; Pittman &

Armitage, 2016). Coastal governance and coastal management are therefore interdependent in the sense that effective governance systems are meant to enable practical management strategies to be applied. Indeed, the coastal governance and landscape governance debates are still evolving, and regarding its operationalization, both debates have mainly focused on management approaches to operate their governance conceptualisation. Coastal and landscape governance acknowledge that governance and management must be operationalised at the local scale. In the coastal governance debate, three approaches have relevance in the literature worldwide: integrated management, ecosystem-based management and land-sea conservation planning. Integrated coastal management is the most politicised due to Rio 92, yet ecosystem-based management has become relevant to the current debate due to the growing amount of ecosystem services literature (Pittman & Armitage, 2016). Integrated landscape approaches are dominant in landscape governance (Arts et al., 2017b). For Reed et al. (2020) these are the 'next generation of integrated approaches' because of two intrinsic characteristics – working at the landscape scale and assuming trade-offs as a critical premise for establishing management goals. Landscape approaches have become a driving paradigm in the international environmental realm, primarily to address landscape forest restoration in the Global South.

Both ICZM and a landscape approach can be simultaneously a governance and a management process depending on the lens and scale used to assess them. ICZM and the landscape approach goals, values, norms and principles underpinning them are set from a governance perspective, addressing the relationship between the governance system, the system-to-be-governed, and the interactions between both. The operational tasks to achieve specific outcomes and their measurability are already in the management debate. ICZM and a landscape approach as management instruments demand a governance arrangement as a principle. However, the current debate must evolve to make a clear distinction between what constitutes coastal landscape governance operationalisation and coastal landscape management approaches because their similarities and differences are rarely addressed in our literature sample.

Another relevant aspect on the European level is that it also stated that landscape governance and landscape approaches contribute to implementing the ELC measures (Shuttleworth, 2017), yet additional research is needed to explicitly address the correlation between them. The ELC has come into force in 40 member-states of the Council of Europe, which emphasises its central role in coastal landscape governance. The ELC general and specific measures can reinforce coastal landscape governance implementation due to the need for landscape policies and the identification of landscape quality objectives. Coastal landscape governance research can benefit if the debate discusses integrated coastal zone management assessments in relation to integrated landscape approaches to identify complementarities and contradictions. Their relation with indigenous-led approaches must also be explored to enrich the debate on governing and managing indigenous coastal landscapes. Also, the way that trade-offs are assessed on landscape governance is helpful to further coastal conflicts research.

Finally, the landscape governance debate has also emphasised the need to address political ecology in empirical research, tackling questions of power and politics, narratives and knowledge, scale and history, environmental justice and equity to benefit research on coastal governance.

### 3.5 Concluding remarks[5]

This paper explored the relationships between coastal governance and landscape governance at the levels of conceptualisation and operationalisation. To achieve this goal, a systematic literature review was conducted. A considerable amount of recent literature was identified and assessed. Results have shown there is a growing awareness of the relevance of coastal governance and landscape governance. However, evidence confirms that a robust conceptualisation and operationalisation of coastal landscape governance is still missing. In the face of these knowledge gaps, many opportunities for further research in new theoretical and empirical directions were identified for coastal landscape governance.

The cross-sectoral debate between coastal governance, territorial governance and landscape governance literature can enrich how coastal systems are governed. A broad framework for analysing, comparing and promoting coastal landscape governance in policy-relevant research is fundamental for a successful adaptation to the current profound societal challenges.

5 This section was originally titled "Conclusions and future research"

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# 4 Problem statement and research objectives

As outlined in the State of the Art, the integration of the landscape concept into coastal governance systems remains relatively underexplored, with limited evidence available, particularly from an evolutionary perspective. Additionally, there is insufficient knowledge about the cause-effect relationship between the integration of landscape within governance systems and actual changes in coastal landscapes over time. These knowledge gaps emphasise the need for a deeper investigation into how the landscape is integrated into coastal governance and how it affects coastal landscape change.

The research problem arises from the complex governance structures that regulate coastal landscapes. These landscapes are managed by multiple actors[6] and institutions[7] addressing competing, sometimes conflicting, interests and land uses across various intersecting administrative and political scales. Furthermore, many coastal regions worldwide are undergoing significant landscape transformations, partly driven by climate change. This complexity underscores the need for integrated governance approaches that consider the unique characteristics and dynamics of coastal landscapes, referred to as the "coastal condition" (Van Assche et al., 2020[8]).

6 As explained in Section 7, 8, and 9 of this thesis, actors are participants (individuals, groups or organisations) in governance, formally or informally (Beunen et al., 2015).

7 As explained in Section 7, 8, and 9 of this thesis, institutions refer to the rules (regulations, norms, laws, policies, and plans) that coordinate interactions between actors (Beunen et al., 2015).

8 Van Assche, K., Hornidge, A., Schlüter, A., & Vaidianu, N. (2020). Governance and the coastal condition: Towards new modes of observation, adaptation and integration. Marine Policy, 112. doi:10.1016/j.marpol.2019.01.002

In response to these challenges, this research aims to determine whether the integration of landscape into governance systems can contribute to the protection of the coastal landscape, focusing on the Northern Region of Portugal as a case study (explained further in sections 5, 8, and 9). The thesis has four key objectives to achieve this aim. First, it analyses the evolution of coastal and landscape governance debates, identifying trends in both the conceptualisation and operationalisation of coastal and landscape governance over time. Second, it examines the evolution of Portuguese institutions from the national to the regional scale, with a particular focus on the development and integration of the landscape concept. Third, it evaluates the influence of landscape integration on coastal landscape changes, analysing how shifts in policy instruments on the conceptualisation and integration of landscape over time have impacted these transformations. Lastly, the research proposes recommendations for reorienting coastal governance towards a landscape-focused approach, identifying key arguments and areas for further investigation.

Two primary questions guide this research:

1. How has the conceptualisation and integration of landscape within Portuguese coastal planning institutions evolved, particularly across national and regional scales?
2. How has the integration of landscape in governance influenced coastal landscape change?

Together, these research questions provide a comprehensive understanding of the role of landscape within coastal governance from an evolutionary perspective. This research adopts a co-evolutionary perspective, informed by Evolutionary Governance Theory (Beunen et al., 2015[9]; Van Assche et al., 2014[10]), based on the understanding that governance is dynamic and shaped by evolving regulations, norms, and practices. This Theory helps frame this thesis by recognising governance as a relationship between the governance system and the system to be governed, in this particular research, the coastal landscape. More importantly, Evolutionary Governance Theory also highlights the fundamental co-evolution of institutions and actors, where institutions shape actors' behaviours, and actors, in turn, reshape institutional structures (Beunen et al., 2015[10]; Van Assche et al., 201411). Although this research focuses primarily on the content and evolution of Portuguese coastal, planning, environmental and landscape institutions due to time constraints, it acknowledges the role of actors in fully capturing governance evolution. Furthermore, this dynamic between institutions and actors is constrained by path dependencies, where historical decisions and established structures often limit future options, making significant shifts challenging (Beunen et al., 201510; Van Assche et al., 201411). While not the primary aim of this research, these constraints will be considered when analysing the empirical results and their discussion.

Evolutionary Governance Theory also emphasises the importance of power and knowledge dynamics within governance, as actors bring diverse forms of knowledge, interests, and values that affect which voices are amplified and which decisions are prioritised (Beunen et al., 201510; Van Assche et al., 201411). This perspective is particularly relevant to coastal governance, which must address competing interests across multiple scales and adapt to complex and uncertain environmental contexts, especially given climate change and other environmental pressures.

By using Evolutionary Governance Theory as a guiding perspective rather than a strict framework, this research intends to maintain flexibility while capturing the dynamic, layered nature of coastal governance, which is reflected in the research design (section 5). This lens justifies the adoption of a multi-scale and multi-temporal perspective across the research. As already stated, coastal landscapes are governed by multiple institutions and actors across overlapping administrative, political, and spatial scales, each with distinct priorities and policies. Analysing the governance of the coastal landscape by examining the development of various institutions and their effects on the system to be governed across multiple spatial scales (national, regional, and municipal) and temporal scales (primarily 1965–2018, though not exclusively) helps elucidate our research aims of determining whether integrating landscape into governance systems can contribute to coastal landscape protection. Additionally, exploring these evolutions over time may reveal patterns that a single temporal or spatial scale might obscure.

Table 4 synthesises the knowledge gaps, research problem, aim, objectives, and questions of this PhD thesis.

9 Beunen, R., Assche, K. V., & Duineveld, M. (2015). Evolutionary governance theory: Theory and applications: Springer.

10 Van Assche, K., Beunen, R., & Duineveld, M. (2014). Evolutionary governance theory - An Introduction: Springer.

**Table 4** Overview of the Knowledge Gaps, Research Problem, Aim, Objectives, and Questions

| | |
|---|---|
| **Knowledge gaps** | 1. The scientific evidence on the integration of the landscape concept into the governance system of coastal regions is very limited, especially from an evolutionary perspective. |
| | 2. There is insufficient knowledge of the cause-effect relationship between the integration of landscape into the governance system of coastal regions and coastal landscape change. |
| **Research problem** | Coastal landscapes are regulated through various institutions focusing on competing and/or conflicting interests, and land uses at several intersecting administrative scales. Additionally, high levels of landscape transformation, induced partially by climate change, can also be observed in several coastal countries |
| **Research aim** | This research aims to explore the contribution of landscape in safeguarding the coastal landscape. |
| **Research objectives** | 1. To analyse the evolution of the coastal and landscape governance debates over time, identifying trends in terms of its conceptualisation and operationalisation. |
| | 2. To examine the evolution of Portuguese institutions from the national to the regional scale, specifically assessing how the conceptualisation and integration of the landscape concept have developed over time. |
| | 3. To evaluate the influence of landscape integration within coastal institutions on coastal landscape changes, analysing how evolutionary shifts in policy have affected the evolution of the coastal landscape. |
| | 4. To recommend the reorientation of coastal governance towards coastal landscape governance, outlining key arguments and identifying critical areas for further research. |
| **Research questions** | RQ1. How has the conceptualisation and integration of landscape within Portuguese coastal planning institutions evolved, particularly across national and regional scales? |
| | RQ2. How has this evolution influenced coastal landscape change? |

*© Arquivo Municipal de Lisboa | Crianças brincam na água [Children playing in the water], Artur Pastor, PT/ AMLSB/ ART/009/011151*

# 5 Research design

This section provides an overview of the research design, which is guided by a critical realist paradigm (Buch-Hansen & Nielsen, 2020[11]) and employs an explanatory case study methodology (Yin, 2009[12]) to investigate the thesis's two main research questions. The explanatory case study methodology (Yin, 2009[13]) is well-suited to exploring both the how and why of specific phenomena, with a focus on uncovering causal relationships and the underlying mechanisms within real-world contexts (Yin, 2009[13]). This methodology also allows an in-depth examination of cause-effect relationships, making it ideal for investigating our research (Yin, 2009[13]).

Critical realism combines realist ontology (the belief that reality exists independently of human perceptions) with a critical epistemology, recognising that our knowledge of that reality is always mediated by context and perspective (Buch-Hansen & Nielsen, 2020[12]). This reality is stratified into empirical, actual, and real levels, structured by causal mechanisms, which we partially be understand. This stratified view of reality, structured across empirical, actual, and real levels, helps differentiate between what we observe, what happens beyond our observations, and the underlying causes of these events (Buch-Hansen & Nielsen, 2020[12]). Knowledge is always imperfect and mediated by social and historical contexts (Buch-Hansen &

11 Buch-Hansen, H., & Nielsen, P. (2020). Critical realism: Basics and beyond: Bloomsbury Publishing.

12 Yin, R. K. (2009). Case study research : design and methods. Thousand Oaks, Calif: Sage Publications.

Nielsen, 2020[12]). Critical realism emphasises the need to understand both observable outcomes and the deeper mechanisms and contextual factors that drive them. By examining both structure (e.g., laws, institutions, policies) and agency (e.g., actions of individuals and groups), critical realism provides a comprehensive view of governance as a dynamic and evolving system (Buch-Hansen & Nielsen, 2020[12]). This perspective aligns closely with Evolutionary Governance Theory (Beunen et al., 2015[13]; Van Assche et al., 2014[14]), which addresses governance also as a dynamic, evolving system shaped by historical, social, and institutional influences.

While this research does not explicitly assess the relationship between structure and agency, as already mentioned, it focuses on the evolution of how the concept of landscape has been integrated across various institutions, using multi-spatial and multi-temporal analysis to examine its impacts on the coastal landscape. Critical realism enables an exploration of governance as an adaptive system, where structural forces and the actions of agents interact to shape the governance outcomes. This perspective supports the thesis's aim of investigating the role of landscape in safeguarding the coastal environment within the Portuguese context as it supports the explanatory aims of our research, aligning with its causal mechanisms and contextual influences.

### 5.1 Case studies selection and research rationale

The unit of analysis in this research is the governance system, specifically, its institutions and their impacts on the coastal landscape. It is examined through an explanatory multiple case study research that facilitates theoretical replication (Yin, 2009[15]). The research design begins with an analysis of the Portuguese national context (1950-today, Section 7), followed by the Northern Region (1978-2021, Section 8). Then, it explores three municipalities within this region (1965-2018, Section 9): Vila do Conde, Póvoa de Varzim, and Esposende.

13 Beunen, R., Assche, K. V., & Duineveld, M. (2015). Evolutionary governance theory: Theory and applications: Springer.

14 Van Assche, K., Beunen, R., & Duineveld, M. (2014). Evolutionary governance theory - An Introduction: Springer.

15 Yin, R. K. (2009). Case study research : design and methods. Thousand Oaks, Calif: Sage Publications.



The decision to focus on Portugal, and specifically the Northern Region, stems from both practical and personal reasons. Professionally, I have had the opportunity to reflect on the Northern coastline since my graduation on landscape architecture, and later during my professional work with the Coastal Zone Management Programme. Additionally, the availability of information and cartography in this region made it a more feasible choice for my research, compared to other potential case studies. On a personal level, my motivation to dedicate my research to this area is deeply rooted in my childhood connection to the landscape.

Beyond these practical and personal factors, Portugal also serves as a relevant international case study. The country's diverse coastline, its history of coastal and landscape planning, its membership in the European Union, and the challenges it faces with coastal and climate change (discussed in section 7) all contribute to its significance. The selection of the Northern Region is further justified by the pioneering study "Landscape Recognition of the Coastal Zone between Caminha and Cortegaça" by Ilídio de Araújo in 1978, a rare and underexplored work in Portugal (see section 8). Within this region, the choice of the three municipalities (Vila do Conde, Póvoa de Varzim, and Esposende) is informed by the region's nature-protected areas movement (see section 9). The different timeframes used in the research are justified in each article, depending on the analysis of legislative pieces, coastal planning plans, or cartographic data availability.

The methodology combines both deductive and inductive approaches. For more details, please refer to the methods section of each article. A deductive-inductive approach is used to assess the national context (Section 7), while a purely deductive approach is applied in the regional context (Section 8). Section 9, which examines the evolution of coastal landscape, relies on the results from Section 8 to guide the analysis. It follows a deductive approach while requiring interpretive judgment to select the most relevant data for spatio-temporal comparison. Finally, Section 10, where the main findings and conclusions are presented, follows an inductive approach as the emerging findings are interpreted and contextualised in light of the guiding principles of Evolutionary Governance Theory. While each article includes some underlying reflections related to Evolutionary Governance Theory, applying this theoretical lens was not the primary goal of the individual articles. Instead, using this Theory primarily at the thesis's conclusion allows for a comprehensive, theory-driven synthesis that highlights overarching patterns and governance dynamics across the entire body of research. This approach

enables new understandings to emerge from the collective findings, providing insights not emphasised in each article individually and contributing a Portuguese perspective to the broader literature.

### 5.2 Primary methods

This research employs two primary methods; for specific details, please refer to the methods section of each article:

- Qualitative content analysis: This method allows for an examination of the evolution of the conceptualisation and integration of landscape within Portuguese institutions from the national (environmental, coastal, landscape and spatial planning legislative pieces) to the regional context (coastal planning plans).

- Spatio-Temporal analysis: This spatial analytic method allows us to observe and quantify changes in coastal landscapes over time. By collecting and analysing spatial data at multiple intervals it captures landscape changes, linking the evolution of institutions with observable impacts on the coastal landscape.

Content analysis was selected to trace the evolution of the concept of landscape and its integration in Portuguese institutions (legislative pieces and coastal planning plans) at the national and regional scale, while the spatiotemporal analysis enables a quantitative assessment of landscape changes at the municipal scale, providing an empirical basis for answering our research questions. This methodology aligns with the thesis's critical realist foundation by uncovering not only observable trends but also the underlying structural and contextual factors that drive these outcomes.

### 5.3 Methodological Triangulation

To ensure methodological triangulation, this research uses multiple data sources and complementary methods (Yin, 2009[16]). Qualitative content analysis provides contextual insights into the evolution of the integration of landscape in Portuguese institutions, while quantitative spatiotemporal analysis offers empirical data on coastal landscape changes. By combining these complementary methods across multiple scales, this research enhances both the depth and robustness of its findings. The triangulated approach, integrating data from national, regional, and municipal levels over an extended temporal period, strengthens causal inferences and provides a nuanced understanding of how landscape integration has evolved and influenced the coastal landscape evolution.

### 5.4 Validity and Reliability

According to Yin (2009[17]), case study research must pay careful attention to both validity and reliability throughout the research design, analysis, and interpretation phases.

- **Construct Validity:** This research carefully defines key concepts across each article. Methodological triangulation is applied by combining qualitative content analysis of institutions with quantitative spatiotemporal analysis of landscape changes. This approach captures each construct from multiple perspectives, aiding in the validation of interpretations. Additionally, a standardised framework for content analysis and consistent criteria for spatial analysis measurements maintain validity across case studies.

- **Internal Validity:** This research will enhance internal validity by carefully linking observed changes in coastal landscapes to changes in the conceptualisation and integration of landscape in Portuguese institutions over time, ensuring that any associations drawn are empirically well-supported. This is achieved through a systematic analysis of documents alongside spatiotemporal data. Examining the timing and context of these governance shifts in relation to European changes helps to identify patterns and potential causal relationships, reinforcing internal validity.

16 Yin, R. K. (2009). Case study research : design and methods. Thousand Oaks, Calif: Sage Publications.

17 Yin, R. K. (2009). Case study research : design and methods. Thousand Oaks, Calif: Sage Publications.

- **External Validity:** Although generalising from case study research is limited, this research enhances external validity by linking findings to broader scientific discussions on coastal and landscape governance and situating its main findings within Evolutionary Governance Theory. Embedding findings within established debates, demonstrates how the research insights connect with and contribute to scientific and policy discussions, enhancing applicability to similar contexts.

- **Reliability:** A systematic and consistent methodological approach will be applied across each article, with standardised methods for data collection and analysis. This approach enhances replicability, allowing other researchers to follow the methodology accurately.

### 5.5 Alignment of the articles with the overall research design

Each article within this thesis contributes with specific methods aligned with specific research objectives and research questions while collectively advancing the thesis's two principal research questions.

Figure 2 provides an overview of the main steps of the research structure and methodology.

Table 5 presents the alignment of each article with the main research questions, providing a coherent progression from theoretical background to empirical findings and research recommendations.

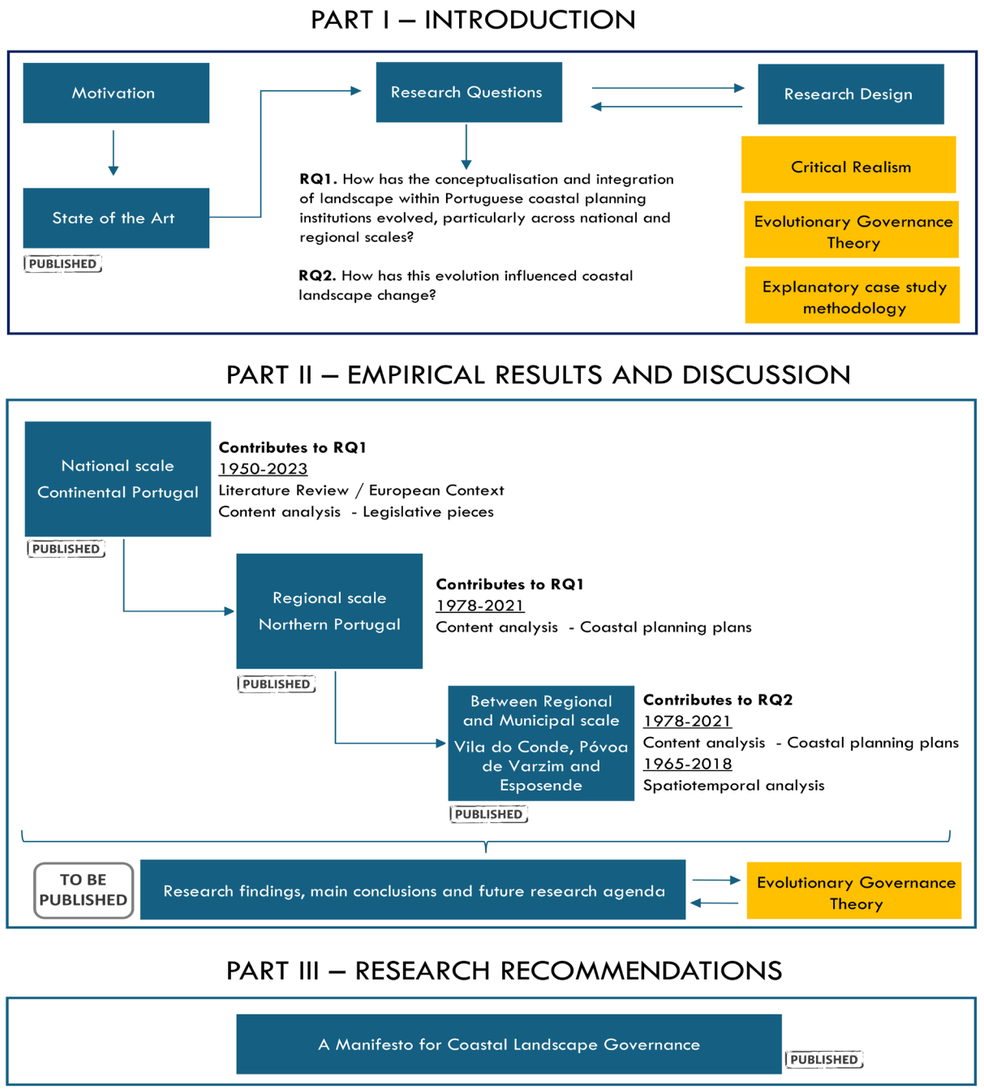


**Figure 2** Overview of the research

**Table 5** Alignment of Articles' Research Objectives, Questions, and Methods with Thesis Research Questions

| **Thesis Part** | **Part I - Introduction** | **Part II - Empirical results and discussion** | | | | **Part III - Research Recommendations** |
|---|---|---|---|---|---|---|
| Thesis Section | 3 | 7 | | 8 | 9 | 10 |
| Article Citation | Gonçalves, C., & Pinho, P. (2022). In search of coastal landscape governance: a review of its conceptualisation, operationalisation and research needs. Sustainability science, 17(5), 2093-2111. doi: https://doi.org/10.1007/s11625-022-01147-6 | Gonçalves, C., & Pinho, P. (2024). Does landscape play a role in the governance of the coastal region? An evolutionary perspective from Portugal since 1950. Progress in Planning, 181, 100811. doi:https://doi.org/10.1016/j.progress.2023.100811 | | Gonçalves, C., & Pinho, P. (2025). The governance of the coastal region: evolutionary changes in the conceptualisation and integration of landscape in Portuguese coastal planning institutions. Landscape Ecology, 40(2), 41. doi: https://doi.org/10.1007/s10980-025-02053- | Gonçalves, C., Pinho, P., & Gonçalves, J. A. (2025). Landscape science, coastal instruments, and landscape change: Evolutionary insights from Portugal. Progress in Planning, 196, 100959. doi:https://doi.org/10.1016/j.progress.2025.100959 | Gonçalves, C., & Pinho, P. (2024). A manifesto for coastal landscape governance: Reframing the relationship between coastal and landscape governance. Ambio. doi:1 https://doi.org/0.1007/s13280-024-02040-5 |
| Objectives of the article | To identify potential theoretical and empirical alliances by incorporating the landscape governance lens into coastal governance to advance the coastal landscape governance emerging field | To identify key European trends and ideas within coastal and landscape discussions;<br>To determine how European policy shifts might have impacted the governance of coastal regions in the context of Portugal.<br>To trace the co-evolution of the institutions and actors of the governance of the coastal region, particularly emphasing the integration of the landscape concept | | To advance coastal landscape governance research by examining the evolution of the conceptualisation and integration of landscape in Portuguese coastal planning institutions, assessing wether the narrow view found in the national laws in reflected at the policy instrument level | Examine the relationship between landscape conceptualisation in coastal management plans and actual landscape changes at the local level, focusing on land use and land cover changes<br>To determine whether high levels of landscape integration have led to increased landscape protection in coastal regions | To explore the potential value of coastal landscape governance, drawing on the Council of Europe Landscape Convention<br>To explore the potencial advantages of reorienting coastal governance towards coastal landscape governance |
| Research question(s) of the article | How has the coastal and landscape governance debate evolved over time?<br>What are the main trends and areas of discussion within the coastal and landscape governance debates?<br>What research gaps exist within the current coastal and landscape governance debates that warrant further exploration? | How has the landscape concept been integrated into the governance of the Portuguese coastal region, at the national scale? | | How have the conceptualisation and integration of landscape in Portuguese coastal planning instruments evolved? | How do coastal plans conceptualise and integrate landscapes, and how does this relate to actual changes at the local level? | 1) What are the potential advantages of reorienting coastal governance towards a coastal landscape governance approach? |
| Methods of the article | Systematic literature review (PRISMA protocol) | Narrative literature review<br>Content analysis (deductive and inductive approach)<br>Time frame: 1950 to present | | Content analysis (deductive approach)<br>Time frame: 1978-2021 | GIS analysis<br>Coupling analysis<br>Time frame: 1965-2018 | Narrative literature review |
| Contribution to main research questions | Provides the State of the Art, identifying research gaps and supporting the thesis's aim to explore landscape integration within coastal governance | Directly addresses RQ.1 by analysing the integration of landscape within Portuguese planning institutions at the national scale, confronting it with European discourse, and examining shifts over time. | | Contributes to RQ.1 by exploring how changes in the conceptualisation and integration of landscape have occurred at the regional scale in three coastal plans. | Contributes to both RQ.1 and RQ.2, examining the local impacts of conceptualisation and integration of landscape in the three coastal plans on coastal landscape change. | The article presents several recommendations towards coastal landscape governance. |

© Arquivo Municipal de Lisboa | Panorâmica de praia na Póvoa de Varzim [Panoramic view of the beach in Póvoa de Varzim], Artur Pastor, PT/ AMLSB/ART/009/011164

# 6 Thesis outline

This thesis is structured into 11 sections, organised into three main parts.

**Part I - Introduction** consists of six sections, including a published research article.

It includes the current section, where the motivation (**Section 1**), research context (**Section 2**), state of the art (**Section 3**, previously published in *Sustainability Science*, 2022), problem statement and research objectives (**Section 4**), research design (**Section 5**), and the thesis outline (**Section 6**) are presented.

**Part II - Empirical Results and Discussion** consists of three sections, each corresponding to a research article, one already published, and two under consideration by two different journals:

**Section 7** (published in *Progress in Planning*, 2024) focuses on the Portuguese national context, situating it within the broader European context. It examines the historical evolution of landscape integration within environmental, landscape, coastal, and spatial planning legislation since the 1950s.

**Section 8** (published in *Landscape Ecology*, 2025) investigates how the conceptualisation and integration of landscape within coastal planning instruments in Northern Portugal evolved from 1978 to 2021.

**Section 9** (published in *Progress in Planning*, 2025) examines the impact

of landscape integration within coastal planning instruments in Northern Portugal on coastal landscape changes from 1965 to 2018 in Vila do Conde, Póvoa de Varzim, and Esposende.

**Section 10** provides a general discussion of the research findings, conclusions, and outlines the principal limitations of the current research. It also suggests directions for future studies to further advance the field of coastal landscape governance.

**Part III - Research Recommendations** concludes the thesis with a published scientific article.

**Section 11** (published in *Ambio*, 2024) presents a manifesto that advocates for a transformative approach to coastal governance, calling for a shift towards coastal landscape governance.

**The Snail,** 1953, Henri Matisse. Purchased with assistance from the Friends of the Tate Gallery 1962. © Succession Henri Matisse/DACS 2024. Photo: Tate.

# PART II — EMPIRICAL RESULTS AND DISCUSSION

**Reference**

Gonçalves, C., & Pinho, P. (2024). Does landscape play a role in the governance of the coastal region? An evolutionary perspective from Portugal since 1950. Progress in Planning, 181, 100811. doi: https://doi.org/10.1016/j.progress.2023.100811

**Contributions**

CG: Conceptualisation, Writing – original draft, and review & editing, Funding acquisition. PP: Writing – review & editing, Supervision, Funding acquisition.



# 7 At the National scale

## Does landscape play a role in the governance of the coastal region? An evolutionary perspective from Portugal

## Abstract

The landscape crisis and the climate crisis strongly affect coastal landscapes in many coastal regions worldwide. Evidence shows that the difficulty of governing coastal regions has increased alongside the attractiveness of contemporary societies for settlements near the coastline. There is a growing debate in landscape governance conceptualisation and operationalisation, in landscape research. Despite the significant progress on this theme, empirical discussions on coastal landscapes are scarce, a trend already followed by landscape and coastal planning and management debates, highlighting the need for empirical research. This article explores this research gap, conducting an evolutionary analysis of the governance of the coastal region in Portugal, tracing the co-evolution of its institutions and actors since 1950 to understand whether the landscape concept has been integrated into the governance of the coastal region. Our research design comprised two main parts. Firstly, we conducted a literature review comparing the Portuguese landscape and coastal governance diachronic analysis with the evolution at the European

level. Secondly, we undertook a content analysis of the principal legislative institutions over the analysed time frame. Results reveal that Portuguese governance evolution diverges somehow from European trends, particularly after the European Landscape Convention, and show that the integration of the landscape concept into the coastal governance system was strongly dependent on powerful actors, their particular interests, values and stocks of knowledge. Along its evolutionary path, the imperative for coastal landscape governance arises from recognising its pivotal role in addressing the intricate and interconnected challenges inherent to coastal regions, needing further research to advance its theoretical and empirical knowledge.

**Keywords:** Governance; Evolutionary governance theory; Landscape sustainability science; Policy integration; Socio-ecological systems; Landscape approaches.

## 7.1 Introduction

In recent decades, in many coastal countries, high levels of coastal landscape transformation have been observed due to increasing pressure from urbanisation, industrialisation, and/or tourism, leading to profound losses of biodiversity and landscape values (Antrop, 2017; Williams et al., 2022). At the European level, the process of coastalization (Lagarias & Stratigea, 2023), combined with the implementation of several types of infrastructures and the banalisation of architectural quality (Nogué & Wilbrand, 2018), have been changing the structure, functions and dynamics of many coastal landscapes, questioning their character and identity.

Despite the continuous political and scientific claims of the need to safeguard, protect and enhance coastal regions, economic development, land use change, and urban sprawl continue to cause extensive changes in several social, cultural, and ecological systems across the globe (Rempis et al., 2018). Besides the well-known problems and pressures many worldwide coastal landscapes face, climate change's impacts pose additional challenges for most coastal regions (IPCC, 2022a). Rising sea levels, extreme weather events, changing ocean currents and water temperatures are some of the impacts already intensifying these areas' vulnerability, leading to increased habitat loss, coastal erosion and flooding, with rising risks for the human populations living in these regions (IPCC, 2022a; Roffman et al., 2023).



In addition, the difficulties of planning and managing coastal regions have increased alongside the attractiveness in contemporary societies of settlements near the coastline, making its governance even more complex (Partelow et al., 2020). Indeed, coastal regions are regulated through various institutions at several administrative scales, with overlapping jurisdictions, responsibilities, and interests. Today, governance involves numerous stakeholders and actors and multi-level decision-making, from the international to the local level, ensuring the coordination of actions and policies across different administrative and spatial levels (Kooiman, 2003). Integration and coordination between several sectoral policies are also considered crucial issues despite the several difficulties in achieving them (Van Assche et al., 2022; Van Assche et al., 2020a). Governance is no longer an exclusive task of governments, encompassing a wide range of public and private actors with different and often conflicting interests, perspectives and values (Stead & Kovács, 2015). The interaction between markets, governments, and civil society leads to new governance arrangements. In many coastal countries, the State lost its power, opposing the convention state-led control approach that traditionally governed the public commons in the past (Ostrom, 2015; Stoker, 1998). Today, several theoretical lenses co-exist to approach coastal governance. According to Partelow et al. (2020), adaptive governance, interactive governance theory, and evolutionary governance theory allow a more comprehensive scope of analysis of the several factors that influence coastal governance.

The debate on coastal governance, influenced by the mainstream of the governance debate, has gained scientific relevance after 2007 (Gonçalves & Pinho, 2022). Before, discussions took place within the theoretical and empirical framework of coastal planning and management, dating back to the 1970s. Coastal governance evolved from environmental governance theory to address the specificities of the coastal context (Partelow et al., 2020). Despite no consensus on definition, the coastal governance debate focuses on three complementary elements: its structural components (procedures and institutions), the process (actors and their power relations), and governance as a theory exploring its relationship with environmental governance and the different possible modes of approaching it (Pittman & Armitage, 2016). Today, given persistent worldwide environmental problems and challenges in general and in coastal regions in particular, the debate acknowledges that without significant changes in coastal governance (Van Assche et al., 2020a), there is a high risk that coastal regions will further decline, failing to adapt to the changing climate and society. Moreover, maritime spatial planning is another

relevant element that adds even more complexity to coastal governance. Maritime spatial planning has experienced significant growth since the late 20th century, with notable advancements and increased attention from policymakers and researchers in the early 21st century. The sea became an object of planning and management, and governing land-sea interactions and the coastal region became even more relevant, requiring multi-level governance and new forms of policy integration (Schlüter et al., 2020b).

In environmental governance research, aware that the quest for multi-level decision-making was remarkably pressing for environmental governance, Görg (2007) introduced the systematic conceptualisation of landscape governance, claiming that landscape governance can reconnect the politics of scale (multi-level governance) with the natural conditions of places. Several authors claim that landscape governance is environmental governance spatialisation (Van Oosten et al., 2018b; Visseren-Hamakers, 2015). Landscape governance builds on the landscape concept and explores the advantages of its contemporary conceptualisation as a bridging concept between natural and social sciences. Discussions also acknowledge the benefits of using the landscape concept as a vehicle for governance at different scales rather than merely an object of planning or management (Van Oosten et al., 2021; Van Rooij et al., 2021).

However, despite the growing debate on landscape governance, the body of knowledge on this topic is still relatively small, and the concept still has no consensus about its definition. Discussions are dominated by Kozar's et al. (2014) argument, centred on the governance process and its instruments in the sense of good governance based on the landscape conceptualisation (Gonçalves & Pinho, 2022). Empirically, landscape governance literature mainly addresses landscape forest restoration in the Global South. This trend is justified as several international institutions, such as IUCN or FAO have been publicising the advantages of landscape governance and landscape approaches (Arts et al., 2017a; Kozar et al., 2014) to cope with very difficult problems in this geographical context, and as several ongoing reforestation projects are occurring in this region. At the European level, discussions are limited, yet Pătru-Stupariu and Nita (2022) assert that landscape governance is an upcoming research trend driven by the impact of the Council of Europe Landscape Convention on interdisciplinary and transdisciplinary research. Indeed, in 2000, the Council of Europe presented a relevant political statement on the value of all landscapes (Council of Europe, 2000a). The signatory countries of the Convention declared their commitment to promoting their landscapes' protection, management and planning to enhance their quality,



including coastal landscapes. The Convention scope is clear, stating that it "*applies to the entire territory of the Parties and covers natural, rural, urban and peri-urban areas. It includes land, inland water and marine areas*" (Council of Europe, 2000, article 2).

Despite the significant progress in landscape governance research during the last few years, empirical discussions on the governance of coastal landscapes are also scarce (Gonçalves & Pinho, 2022), a trend already followed by landscape planning and management debates (Döring & Ratter, 2018). This tendency is also followed by coastal governance research as discussions on coastal landscapes are also limited (Gonçalves & Pinho, 2022). However, the absence of scientific evidence on the lack of integration of the landscape concept in the governance system of coastal regions or as a specific object of planning and management does not mean that this has not occurred in practice, as empirical research is limited. Overcoming this gap is fundamental to gain the empirical base necessary to improve our knowledge of how the landscape concept has been integrated into the governance of the coastal region and to what extent the consideration of the landscape concept in the governance of the coastal region has impacted its outcomes. The relationship between these two main research questions is fundamental for building the empirical proof that allows us to investigate new forms of governance for the coastal region. This article aims to explore this research gap, focusing on the first question - how has the landscape concept been integrated into the governance of coastal regions -, as we consider this to be is the starting point for understanding how the landscape concept has shaped the coastal region governance system because new possible forms of governance must be context-dependent and founded in prior knowledge, learning from their evolutionary pathways (Beunen et al., 2015).

Mainland Portugal was chosen as a case study, and we conducted an evolutionary analysis of coastal and landscape governance, tracing its principal institutions and actors' co-evolution since 1950. The Portuguese institutions and actors' co-evolution will be confronted with the European context evolution, focusing on their post-modern history to identify the main trends/ideas and their influence on the Portuguese reality. This case study is selected because it has a diverse and extensive coastline, presenting various coastal landscapes with varying ecological, cultural, and socio-economic characteristics. Secondly, Portugal has a long and rich history of coastal and landscape planning and management initiatives, making it a valuable source of information on past and current governance practices. Thirdly, Portugal is part of the European Union

and a signatory country of the Council of Europe Landscape Convention, which might significantly influence its institutions and actors in place. Lastly, Portugal faces various challenges related to coastal landscape change, coastal erosion, sea-level rise, and coastalization, making it a pertinent case.

From an evolutionary governance theory perspective (Beunen et al., 2015; Van Assche et al., 2014), assessing the co-evolution of institutions and actors allows one to understand the governance system because both actors and institutions are interdependent and shape each other over time (Daniell et al., 2020). Governance is not static but rather a dynamic process that evolves as actors and institutions interact and adapt to changing circumstances (Beunen et al., 2015; Van Assche et al., 2014). Governance always involves the constant co-evolution between the governance system (with its institutions and actors) and the system to be governed (the object) and their power and knowledge relations (Kooiman, 2008; Van Assche et al., 2020a). Governance is indissociable from the planning and management institutions and actors, and any effort to trace its governance evolution must, in the first stage, assess its institutions and actors' co-evolution. We follow Beunen et al.'s (2015) definitions of institutions and actors, which are now explained to avoid misunderstandings. Institutions are rules (regulations, norms, laws, policies, and plans) of coordination between actors. Actors are participants (individuals, groups or organisations) in governance, formally or informally.

This research article is intended to contribute to a better understanding of the pathway of the governance of the coastal region in Portugal, exploring how evolving institutions and actors have shaped the integration of the landscape concept into coastal governance over time. Although these findings cannot be generalised, they have the potential to provide relevant insights that can contribute to broader discussions on coastal governance.

## 7.2 Methods

The main objective of this article is to understand whether the landscape concept has been integrated into the governance of the coastal region through an evolutionary analysis of its principal institutions and actors. The research started with a literature review, followed by a content analysis. The temporal analysis covers the period from the 1950s to the present.

The authors utilized the SCOPUS database for the literature review to retrieve relevant articles in November 2022. The articles were selected based on the credibility of the researchers and the journal, time-frame coverage, and relevance of the article topic for coastal or landscape diachronic analysis, mainly including papers that are 'review articles'. The search and results were organised into two levels of analysis: the European and the National level (Table 6).

At the European level, the objective was to identify key trends and ideas within coastal and landscape discussions, aiming to determine how policy shifts might have impacted the governance of coastal regions in the context of Portugal.

In the Portuguese context, the objective was to trace the co-evolution of the institutions and actors of the governance of the coastal region, particularly emphasising the integration of the landscape concept. To achieve this, the analysis also encompassed the evolution of spatial planning and environmental institutions and actors, considering that coastal and landscape institutions are embedded in their legal framework. Within this level of analysis, two specific exclusion criteria were established for this article. Firstly, the assessment of plans was excluded, with a focus solely on significant legislative components, comprising laws or policies. Secondly, despite acknowledging their substantial impact on governance systems, our research does not encompass European Union and National funding schemes. These exclusion criteria were set as each of them could be a distinct empirical research.

After tracing the diachronic evolution of Portuguese institutions and actors, we delve deeper into understanding the integration of the landscape concept. To achieve this, we identified the key institutions developed in Portugal since the 1950s (Table 9) and conducted a qualitative content analysis (Elo & Kyngäs, 2008). Initially, we adopted a deductive content analysis approach, adapting the protocol employed by Hersperger et al. (2020), which assessed the role of "landscape" in strategic spatial plans in several European countries, as their protocol followed the present landscape research debate. From this adapted protocol, we constructed an analysis matrix incorporating the most relevant aspects for our research.

**Table 6** Selected articles included in the literature review

| Articles assessed in the European context |
|---|
| Chatzimentor et al. (2020) |
| Oliveira et al. (2020) |
| Pinho (2020) |
| Pérez-Cayeiro et al. (2016) |
| Marcucci et al. (2012) |
| Antrop (2013) |
| Pinho (2007b) |
| Kay and Alder (2005) |
| Fábos (2004) |
| **Articles assessed in the Portuguese context** |
| Oliveira et al. (2020) |
| Campos and Ferrão (2018) |
| Schmidt et al. (2013) |
| Pinto and Partidário (2012) |
| de Freitas (2010) |
| Araújo (2009) |
| Ferrão and Ramos (2006) |
| Andresen et al. (2005) |
| Andresen (2003) |
| Veloso-Gomes and Taveira-Pinto (2003a) |
| Pinho (1985) |

However, as our analysis covers a significant temporal spectrum, we recognised the need for an inductive approach to complement our deductive content analysis and we proceeded with document analysis. In doing so, we aimed to explore and uncover any emerging themes or ideas that were not initially part of our predefined analysis matrix. This flexible and adaptive method enables us to capture nuances, complexities, and details that might have evolved but were not explicitly foreseen in our initial framework. Along with the document analysis, new categories were derived directly from the data, allowing us to uncover emerging themes or ideas not previously accounted for (as presented in Table 7).



**Table 7** Items used to assess how the landscape concept has been integrated into the Portuguese main coastal, landscape, environmental and spatial planning institutions (adapted from Hersperger et al. (2020))

| Item | Coding |
|---|---|
| **0. EXPLICIT USE OF THE WORD LANDSCAPE** | |
| 0.1. When was the law/policy approved?** | year |
| 0.2. How often does the law/policy contain the word landscape (paisag*)?** | exact count |
| 0.3. Is this law/policy relevant for the governance of the coastal landscape? | a) yes (with references to landscape) |
| | b) Yes (focus on coastal governance) |
| | c) No |
| **1. CONCEPTS** | |
| Does the law/policy defines landscape? | a) yes |
| | b) no |
| Which landscape concept perspective is used?** | holistic (Council of Europe Landscape Convention) |
| | bio-physical |
| | socio-cultural |
| | aesthetics |
| | not available |
| Is landscape perceived in broad or limited thematic contexts? ** | a) Broad perspective |
| | b) Agriculture/farming |
| | c) Water or coastal management |
| | d) Forestry |
| | e) Nature conservation |
| | f) Biodiversity |
| | g) Green infrastructure |
| | h) Built-up containment |
| | i) Tourism and recreation |
| | j) Sustainability |
| | k) Aesthetic |
| | n) Limited perspective but inconclusive context |
| Does the law/policy introduces other relevant concepts? | a) yes - general for landscape |
| | b) yes - explicitly linked to coastal landscape |
| | c) no |

| Item | Coding |
|---|---|
| **2. LAW/POLICY REFER TO LANDSCAPE IN ALL MAIN SECTIONS** | |
| In which Law/Policy section is landscape included? ** | a) Background (The background section explains the context by which the policy has been created) |
| | b) Purpose (The purpose statement outlines what the policy document is designed to achieve) |
| | c) Scope (The scope explains the range of application of the document) |
| | d) Definitions (Clarification of the terminology used) |
| | f) Policy statements (rules) |
| | e) Procedures (Procedures provides detailed procedural requirements) |
| Does the law/policy establish landscape instruments? | a) yes - explicitly linked to landscape |
| | b) yes - explicitly linked to coastal landscape |
| | c) yes - related to landscape / coastal landscape |
| | d) no |
| Does the law/policy indicates relevant actors? ** | a) yes - only state actors |
| | b) yes - multi-stakeholders |
| | c) no |
| Is this landscape law/policy? | a) Yes |
| | b) No, but is content contributes to it |
| | c) No |

**Adapted from Hersperger et al. (2020) protocol.

By scrutinising these legislative documents, our article will determine the extent to which the landscape concept has been explicitly integrated into the coastal region's governance framework. We will specifically investigate its inclusion within specific coastal policies and in spatial, environmental, and landscape-related policies, as all are fundamental for the governance of the coastal region in our case study.



## 7.3 Results

### 7.3.1 A brief overview of coastal and landscape discourses co-evolution in the International/European context

#### *7.3.1.1 Phase 1 | 1950-1970 – The conservation awareness phase*

Phase 1 occurred between 1950 and 1970, where sectoral or fragmented approaches with a prevalence of hard-engineering solutions and limited ecological considerations dominated. After the Second World War, several relevant international organisations (Food And Agriculture Organisation, United Nations Educational, Scientific and Cultural Organisation or International Union for Conservation of Nature) were created. They intended to foster collaboration among nations for addressing global challenges, including those related to coastal regions, offering a platform for cooperation and knowledge exchange. During this period, coastal planning and management were mainly reactive, dominated by rationalist planning theories, with little to no public participation, and focused on the local level (Kay & Alder, 2005; Pinho, 2007b). Coastal planning and management aimed to hold the coastline, demonstrating the dominance of coastal engineering against natural processes (Pérez-Cayeiro et al., 2016), resulting in altered coastal habitats and sediment dynamics.

Nature and landscape conservation was the primary goal of landscape practice with the emergence of protected natural areas in several European countries (Antrop, 2013; Olwig & Olwig, 2002). The beginning of this movement is marked by the establishment of the Areas of Outstanding Natural Beauty (AONB) in Britain (1956), the Naturpark in Germany (1957) and the Parcs Natureis Regionaux in France (1967) (Antrop, 2013).

England was one of the pioneers in formalising landscape planning and conservation efforts after World War II. Before, several British government leaders tried but only were able to create greenbelts around major towns and cities, due the economic constraints, two world wars, and opposition from property-owners. (Closmann, 2005). The designation of National Parks and Areas of Outstanding Natural Beauty under the 1949 Act represented a significant step towards recognizing the importance of preserving landscapes for their ecological, cultural, recreational, and aesthetic values. National Parks aim to preserve and enhance a location's natural beauty, wildlife, and cultural

heritage and encourage public awareness and enjoyment of its distinctive attributes. The Dower and Hobhouse Reports, published in 1945 and 1947, recommended that specific regions of exceptional landscape quality, scientific significance, and recreational value should be granted special protection in addition to National Parks. As a result, the 1949 Act conferred authority upon the competent Commission to designate areas as "outstanding natural beauty" (Matteucci & Cartei, 2022). Another relevant measure regarding landscape designations was the creation of the Heritage Coast initiative, which also emphasised physical qualities related to scenery, tranquillity and access (Powell et al., 2002). The Heritage Coast program operated through a partnership between the central government and local authorities. Cullen (1984) research demonstrated that this approach has proven effective in designating numerous significant scenic areas as Heritage Coasts. However, its effectiveness in implementing on-the-ground management initiatives along the coast has been comparatively limited.

In Germany, back in 1935, the 'Reichsnaturschutzgesetz' (Reich Nature Protection Act) came into force under the National Socialism regime and would be considered one of the first comprehensive nature and landscape protection laws (Closmann, 2005). The Reich Nature Protection Act expanded its coverage to encompass safeguarding rare or threatened plants, non-game animals, natural landmarks and their surroundings, nature reserves, and "other open natural landscape areas". The Reich Nature Protection Act established a consistent and nationwide administrative system for conservation, establishing a unified administration to handle nature protection, and clarifying the definition of natural areas worthy of protection for all of Germany (von Haaren & Vollheyde, 2019). Also, the law created the "*potential for comprehensive land use planning, beyond the narrow definition of areas worthy of protection that had existed for many years*", and introduced "*evolving notions of Landschaftspflege (the care for the landscape), a concept that emphasized curtailing unattractive, unplanned economic development in favor of an aesthetically pleasing ensemble of streams, roadways, buildings, and countryside"* (Closmann, 2005, p. 18). This idea was relevant, especially when increasingly German landscape architects approached the countryside as an organic entity in which one intrusive alteration would have consequences in another (Closmann, 2005). Indeed, under the National Socialism regime, landscape architects and urban planners had a relevant status position and were one of the professional groups responsible for implementing the Reich Nature Protection Act (Wolschke-Bulmahn, 2005). Indeed, in many cases, they were also responsible for propagating the regime planning ideology (Wolschke-Bulmahn, 2005). However, this discussion is not pertinent to the primary objective of our article. After the war, the German Democratic Republic replaced the Reich Nature Protection Act with a new nature conservation act (Act for the Preservation and Care of Nature in the Homeland, in 1954) that encompassed safeguarding both plant and animal species and establishing provisions for conservation areas specifically protecting endangered species. Landscape planning was not considered relevant as territorial planning should already include environmental concerns (von Haaren & Vollheyde, 2019). In the Federal Republic of Germany, the Reich Nature Protection Act was still in effect and later was only replaced by the Bundesnaturschutzgesetz or Federal Nature Conservation Act 1976 (Mose, 2007; Potschin & Bastian, 2004), aiming to preserve nature and landscapes, through the Impact Mitigation Regulations. The main goal was to avoid significant disturbance or adverse effects and compensation for possible impacts on natural assets such as habitats, soil, water, climate, air quality and the aesthetic quality of the landscape (Wende et al., 2005).

Within Europe, until the 1960s-70s, landscape research was mainly descriptive, emphasising landscape classification, landscape genesis and landscape as the basis for regional identity (Antrop, 2013). In the 1960s, the environmental awareness movement started in the United States of America, which positively impacted the next phase (Andresen & Castel-Branco, 1993). One of the movement leaders, Ian McHarg, published an inspiring book entitled *"Design with Nature"* (McHarg, 1969), setting a new vision for regional planning using natural systems and ecological principles and influencing planning globally. McHarg's (1969) chapter "Sea and Survival" discussed how coastal landscape planning should align with ecological and geomorphological structures and processes. The chapter compares practices in the Netherlands with those on the New Jersey shore. In the latter case, many urban developments led to the complete destruction of the coastal system, and these developments were further destroyed by storms with significant losses. McHarg's plan for the Valley is also considered a relevant contribution to the Greenway movement in the United States of America, as well as the research developed by Phil Lewis at the University of Wisconsin on "Environmental Corridors" and the METLAND project at the University of Massachusetts led by Ervin Zube (Fábos, 2004). Their ideas and principles influenced planning practices globally, including in coastal regions. The environmental awareness movement, the emergence of protected areas classification and the focus on ecological principles were important for coastal regions as they promoted an ecologically informed

approach to planning and management, fostering the intrinsic values of coastal ecosystems and how they interact with human activities. Their vision for regional planning using natural systems also highlighted the importance of maintaining connectivity between different parts of the landscape, which would influence coastal regions' planning in the next phase.

In Europe, in 1957, the European Economic Community (EEC) was created, which would later strongly influence both debates, as it will be discussed later. In 1962, the EEC created a set of laws that provided a unified policy on agriculture (the Common Agriculture Policy), which lasted until today and profoundly changed many coastal agricultural landscapes (Pinto-Correia et al., 2006). In 1970, the Council of Europe launched the "European Conservation Year", a campaign to raise awareness about the importance and necessity of protecting and conserving Europe's environment and natural resources, including those related to coastal landscapes.

#### *7.3.1.2 Phase 2 | 1970-1990 – The environmental movement and the demand for pollution control*

Throughout the 1970s and 1980s, influenced by the previous phase, coastal planning started to integrate ecology into the planning process. The use of quantitative methods, aided by the rapid development of computers, also became a common trend (Antrop, 2013). The application of quantitative methods enabled a more rigorous analysis of data related to coastal dynamics, land use and land cover, and environmental changes. This advancement enhanced decision-making processes by providing more accurate insights into the potential impacts of different planning strategies. The global environmental degradation of water, air, soil, and visual pollution led to a demand for pollution control and, in particular, to the emergence of water resources planning and management at a regional level (Pinho, 2007b). Coastal regions, being ecologically sensitive and economically valuable, were particularly affected by these environmental challenges, making the implementation of pollution control fundamental for their preservation and enhancement.

At the beginning of this phase, landscape characterisation in most European countries was mainly based on visual appearance. In coastal regions, the values attached to the visual landscape and their scenic value had several implications in coastal planning, a trend still present today, for instance, in



France by the Conservatoire du Littoral (Robert, 2018). However, towards the end of the 1970s, it shifted to being grounded on land cover due to the rapid advancement of computers, enabling practical applications of statistical modelling, pattern recognition, and image classification. (Antrop, 2013; Kay & Alder, 2005). The shift towards land cover-based methods brought additional depth and accuracy to landscape assessment, particularly in ecological and functional terms. A contrasting perspective was a philosophical approach to the landscape, highlighting it as a social construction with its perception, narratives and symbols central to its understanding (Antrop, 2013). This approach added another layer of understanding coastal landscapes stating that a landscape's significance isn't solely derived from its biophysical elements but that people's experience and their connections to the coast, their memories, stories and cultural attachments all contribute to the overall understanding of coastal landscapes.

In 1972, the UNESCO Convention concerning the protection of the World Cultural and Natural Heritage was an important achievement (Rössler, 2006). The Convention provided a framework for identifying, safeguarding and conserving valuable cultural and natural sites considered to be of outstanding value to humanity. The Convention contributed to the recognition of many coastal European sites for having cultural, historical, scientific or other forms of significance.

During this period, two relevant laws were established in the United States of America that later would influence European developments. Firstly, the National Environmental Policy Act of 1969, which was the country's first major environmental law, demanded that Federal agencies assess the environmental effects of major federal projects before making decisions, leading to the creation of new landscape study methods (Antrop, 2013; Kay & Alder, 2005), and influencing the implementation of significant projects along coastal regions. Secondly, the Coastal Zone Management Act of 1972 recognised the relevance of coastal zones, encouraging more effective cooperation between the federal government and individual states in managing their coastal zones, and led the National Coastal Zone Management Programmes (Kay & Alder, 2005). These programmes were created as a response to the recognition that effective management of coastal regions was necessary, as coastal areas were facing various challenges such as population growth, urbanisation, pollution and environmental degradation. These international and national influences resulted in a combination of proactive and reactive policies for the coastal zone, balancing precautionary measures, ecological awareness and public

participation while maintaining coastal engineering dominance and sectoral approaches in response to weather emergencies or environmental incidents. Growing ecological awareness played a pivotal role in shaping coastal policies, emphasising the importance of environmental preservation. However, despite this growing consciousness and public involvement, coastal engineering practices remain dominant in coastal planning, as they were crucial for addressing immediate coastal erosion, flood protection, and infrastructure development challenges (Kay & Alder, 2005). In 1971, the Ramsar Convention represented the first international treaty for the conservation and wise use of wetlands of international importance, which was enforced later in 1975. It laid the foundation for subsequent developments and policy changes related to wetland conservation and management over the years (Maltby, 1991), influencing the conservation and sustainable use of coastal wetlands, such as estuaries, marshes, mangroves or lagoons.

At the European level, the Resolution on the Protection of the Coastline of the Council of Europe (1973) recognised for the first time that European coastlines were "*in a critical condition owing to the extremely serious biological degradation and aesthetic disfigurement*" (Council of Europe, 1973, p. 96) and that Member-States should protect them. The first Environment Action Programmes launched by EEC between 1973-1976 and 1977-1981 were mainly concerned with European coastal area planning and ecological management. These programmes incentivised member-states to address their coastal region's planning and management as they allocate financial resources to develop policies and implement measures to address environmental issues along their coastlines. In 1979, the Birds Directive (79/409/EEC) was adopted to ensure the conservation of wild bird species naturally occurring in Europe, influencing the protection of critical various bird populations and their coastal habitats. At the same time, the Bern Convention opened to signature to conserve wild flora, fauna, and their natural habitats, also contributing to coastal regions' habitat protection. In 1981, the European Coastal Charter was presented, advocating the need for integrated management of coastal zones, as most Council of Europe member states continued to distress the alarming deterioration of coastal landscapes (Bürgi et al., 2022; Pierret, 1982).

Considering the variety of European spatial planning systems, the Council of Europe adopted in 1983 the European Charter for Spatial Planning, agreeing on shared principles and guidelines for spatial planning in Europe. The Charter significantly influenced the European Spatial Development Perspective (ESDP, 1999), a non-binding document adopted by the Informal Council of Ministers of Spatial Planning of the European Commission. One of its major criticisms is that it lacked binding legal force, which limited its enforceability and impact. However, the document sets a vision and provides a framework to better coordinate and integrate future spatial development at the European level, addressing challenges such as economic competitiveness, social cohesion, and environmental sustainability. Planning gained significant attention in several member-states, influencing coastal planning, as many coastal European countries do not have a solely coastal governance framework but are integrated into the broader spatial planning framework.

In 1985, sixteen years after a similar USA law, the European Union introduced the Environmental Impact Assessment Directive, which also required that environmental assessments be conducted before certain projects were approved, ensuring that potential environmental impacts were considered in decision-making. A relevant aspect of this law was the analysis of landscape and its visual surroundings as one of the elements to be assessed (Antrop, 2013). Also, being a European directive, it is mandatory for member states which means that although each country has some flexibility in adapting its requirement to their national laws and administrative systems, coastal member states had to integrate it, impacting their coastal regions' planning.

The World Commission on Environment and Development published, in 1987, the Brundtland Report, introducing the sustainable development concept as a *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (Brundtland, 1987), which will dominate the paradigm of discourses in the planning of the coastal region in the following decades.

During this period, efforts were made to address the coastal areas from a more global perspective (Pinho, 2007b), though interventions still mainly focused on concrete problems such as erosion, contamination, or degradation of natural values, moving from a local to a regional scale (Kay & Alder, 2005). The regional scale allowed many governments to recognise the inherent complexities and interconnectedness of coastal regions, allowing for more effective management and coordinating efforts across administrative boundaries. Also, an international movement began influencing several European countries after the political recognition of the Greenways movement in the United States of America in the 1980s (Fábos, 2004). In the transition to the next phase, there was a revival of landscape ecology (Troll, 1939) by ecologists (Forman & Godron, 1986) with a renewed interest in holism, systems theory and dynamics (Antrop, 2013).

Rationalist theories were no longer the dominant planning approach, and there was also an increase in advocacy, equity, and environmental justice (Marcucci et al., 2012). The disproportionate burdens of environmental hazards and pollution, the marginalisation of local communities and their needs in power circuits, and increased awareness of social inequalities emphasised the shift to more participatory and community-based approaches in many coastal countries.

#### *7.3.1.3 Phase 3 | 1990-2000 – The emergence of the sustainability paradigm*

From the 1990s to the turn of the century, the sustainable development concept gained widespread recognition. Sustainability became the dominant paradigm in coastal planning and management, with the national scale considered the most appropriate for integrated interventions due to the scale of environmental problems (Marcucci et al., 2012; Pérez-Cayeiro et al., 2016; Pinho, 2007b). At the European level, a significant milestone was the signing of the Maastricht Treaty in 1992, a key foundation for establishing the European Union (EU) as we know it today. It marked a significant step towards integrating environmental protection, sustainable development and policy integration into the EU's broader policy framework. This integration aimed to develop common environmental policies and legislation, enhance decision-making capabilities, and emphasise the importance of sustainable development and international cooperation in environmental matters, all of which have implications for the governance of coastal regions.

During the Rio 92 conference, Agenda 21 introduced the capacity-building concept and recognised the need for integrated coastal management and interdisciplinary policies, leading to a new model for addressing the coastal region (Oliveira et al., 2020). Compared with the Conservation Awareness phase, where the focus was on the coastline, attention now shifted to the coastal zone, with an increased emphasis on comprehensive environmental management and environmental restoration, along with greater public participation (Marcucci et al., 2012). The Rio 92 Conference strongly influenced European policies regarding the need for integrated management of the coastal zone. Two examples were the "Council Resolution of 25 February 1992 on the Future Community Policy concerning the European Coastal Zone" and the "Council Resolution of 6 May 1994 on a Community Strategy for Integrated Coastal Zone Management". Also, in 1992, a relevant milestone was the integration of cultural landscapes into the UNESCO World Heritage categories becoming the first international treaty to protect them. The Convention recognised the importance of preserving the cultural significance of landscapes as part of our global heritage, leading to the inscription of Portovenere, Cinque Terre, and the islands (Palmaria, Tino and Tinetto), in Italy, in 1997, as the first World Heritage Cultural Landscapes in the coastal region.

In the same year, at the European level, the Habitats Directive (92/43/EEC) was adopted to conserve natural habitats, wild fauna, and flora as a response to the Bern Convention. Together with the Birds Directive, it established the Natura 2000, one of the most relevant European instruments to protect and enhance the most valuable and threatened species and habitats, being assumed as a central part of the European Green Infrastructure both terrestrial and marine areas (Chatzimentor et al., 2020).

Between 1996 and 1999, the European Commission set up a Demonstration Programme on integrated coastal zone management, providing technical knowledge and stimulating a European debate among different stakeholders. This Programme's outputs led to the adoption of two relevant documents: (1) A Communication from the Commission to the Council and the European Parliament on "Integrated Coastal Zone Management: A Strategy for Europe" (2000), and (2) A proposal for a European Parliament and Council Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe (2000), which was later adopted in 2002. The European Commission recognised that various approaches to Integrated Coastal Zone Management existed in the European Union, and the subsidiarity principle did not suggest a centralised strategy but that the individual national strategies should instead be based on a shared vision (Belfiore, 2002). Some criticism was that *"in terms of effectiveness, a framework Directive would be a better option for bringing about ICZM (Integrated Coastal Zone Management) in Europe"* (Humphrey et al., 2000), something that never happened, as spatial planning was and still is, primarily, a competence of individual European Union member states. However, as will be discussed in the Portuguese case, while the European Union's role in spatial planning is not to dictate specific plans, it does provide guidance, coordination mechanisms, and funding opportunities that influence how member states approach their spatial development strategies, including the governance of the coastal region.

In 1997, under the United Nations Framework Convention on Climate Change, the Kyoto Protocol was a major landmark. It aimed to address the problem of global warming by reducing greenhouse gas emissions and establishing a framework for global cooperation. While its direct relevance to coastal zones may not be as pronounced as in other areas, the Kyoto Protocol has implications for coastal regions due to its reminder of the broader impacts of climate change (Simas et al., 2001).

Regarding landscape evolution, in 1995, the First Assessment of Europe's Environment (EEA, 1995), known as The Dobris Report, within the European Union, stated the relationship between landscapes and the European identity, putting landscape on the political agenda (Antrop, 2013). The Pan-European Biological and Landscape Diversity Strategy (1996) was also a relevant framework that recognised the *"growing acceptance of cultural landscape identification, protection and management as suitable subjects for international co-operation"* (Phillips, 1998, p. 30). Later, in 2000, the Council of Europe Landscape Convention reinforced the role of landscape as a common value, crucial for European identity, challenging research and policy for a transdisciplinary and interdisciplinary integration and recognising that all landscapes are important despite being ordinary or outstanding (Council of Europe, 2000a). The Council of Europe Landscape Convention has been considered a driver of change for research (Pătru-Stupariu & Nita, 2022), also impacting the landscape governance system in several European countries differentially (De Montis, 2014; Matteucci & Cartei, 2022). In some cases even lead to innovative landscape planning solutions for the coastal region, as in the Apulia Region, in Italy (Albrechts et al., 2020; Calace & Paparusso, 2022).

During this period, different approaches evolved: *"landscape ecologists focused on the relations between spatial patterns of land use and ecological processes. Historical geographers and archaeologists focused on the genesis of the landscape and its meaning as heritage. Humanistic and cultural geographers focused upon the landscape as a mental and social construct with important symbolic meanings. Separately, landscape architects and design practitioners focused on scenery"* (Antrop, 2013, p. 17). All these perspectives were recognised by the Council of Europe Landscape Convention in its formal definition of landscape as *"an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors"* (Council of Europe, 2000a, p. article 1). The Council of Europe Landscape Convention represented the culmination of the three previous phases, moving *"away from an aristocratic conception of landscape to a democratic one"* ((Conrad et al., 2011, p. 2098) quoting (Olwig & Olwig, 2002)), and providing a scientific basis for the emergence of landscape sustainability science and landscape governance (Pătru-Stupariu & Nita, 2022).



#### *7.3.1.4 Phase 4 | 2000-present – The climate and the landscape crisis and the search for future alternatives*

Phase 4, started with the turn of the century, and it has been dominated by integrated coastal management and the tangible implementation of sustainable development principles. The discourse on climate change intensified, due to the growing global awareness of the urgent need for action, leading to the demand for new approaches to deal with its effects. In the early 2000s, climate mitigation and adaptation measures were considered equally relevant in addressing climate change. Adaptive and ecosystem-based planning and management were seen as alternative and complementary pathways to integrated coastal management (Marcucci et al., 2012). By the late 2000s, the discourse on coastal governance significantly expanded due to the persisting conflicts in many coastal countries among stakeholders, regulatory fragmentation, inadequate resource allocation, and difficulties in coordinating adaptive strategies to tackle coastal erosion, habitat loss, and climate change impacts (Gonçalves & Pinho, 2022) The concept of landscape governance also emerged (Görg, 2007), being discussed as an evolved conceptualisation of environmental governance. More recently, landscape approaches dominate landscape governance operationalisation because of their synergies (Reed et al., 2020). The literature discusses a landscape approach as an integrated and holistic method for managing landscapes that considers social, economic, and ecological interactions within a given geographic area (Sayer et al., 2013). It is a multi-spatial and multi-actor approach that recognises the complexity and interconnectedness of landscapes, including natural ecosystems, human activities, and their interactions, with an emphasis on identifying, negotiating and accounting for trade-offs (Reed et al., 2020). Nevertheless, discussions on landscape governance and landscape approaches seldom permeate coastal governance debates, and the potential synergies between these concepts and the Council of Europe Landscape Convention are also overlooked.

The Council of Europe Landscape Convention also brought to light what Antrop (2017, p. 8) referred to as the landscape crisis – *"the feeling of discomfort many people have because they cannot cope with the increasingly rapid changes they experience in landscape"*. In recent years, landscape change in Europe has been

*"fast, violent and intense"*, questioning their character (Nogué & Wilbrand, 2018, p. 443). This is particularly relevant in many European coastal regions due to the coastalization process (Lagarias & Stratigea, 2023), which has resulted in significant transformations of many local landscapes and contributed to the discomfort felt by local coastal communities. The Council of Europe Landscape Convention challenged the dominant paradigm to shift from an approach focusing predominantly on the protection of landscapes of exceptional beauty or with rare ecological or cultural value to an inclusive approach focusing on all landscapes (Conrad et al., 2011). Additionally, the Council of Europe Landscape Convention has emphasised the need for public participation in the planning, management and protection of landscapes, the importance of context and scale-specific landscape policies, and the need to build capacity at local, regional and national levels (Conrad et al., 2011), but the knowledge on the practical results in coastal governance is still limited.

During this period, the European Union established the Water Framework Directive (2000), defining a common framework for water policy that influenced the planning and management of watersheds and estuaries. While the Directive did not have direct implications for the governance of the coastal region, the manner in which watersheds and estuaries are managed significantly influences the coastal zone. In 2001, the Strategic Environmental Assessment Directive was also enforced, recognising the "landscape" as one of the values to be assessed. The Directive establishes a framework for assessing the potential environmental impacts of plans and programs before their adoption, influencing the environmental and landscape concerns integration across the Member States.

The 6th Environment Action Programme of the European Community (2002-2012) included several actions focusing on implementing integrated coastal zone management. Since the 2010s, the climate change paradigm has become dominant, with research and policy focus shifting from integrated coastal management to marine spatial planning implementation following several European initiatives, such as the green paper *"An integrated maritime policy for the European Union"* (2007) and the Marine Strategy Framework Directive (2008) (Oliveira et al., 2020). In 2013, the European Commission adopted a proposal for a Directive of the European Parliament and the Council establishing a framework for maritime spatial planning and integrated coastal zone. The sea became an object of planning and management, and the concept of a blue economy introduced a fast-growing economic impulse to ocean exploration. Since then, several countries have directed their attention toward developing marine spatial planning plans and initiating the formulation of their blue economy strategies, thereby intensifying the challenges faced in the governance of coastal regions, as policy integration and land-sea interactions remain problematic in the XXI century (Van Assche et al., 2020a).

In 2011, the European Commission adopted the EU Biodiversity Strategy to combat the loss of biodiversity and ecosystem services in the European Union by 2020. In 2013, the European Union launched the Green Infrastructure Strategy, following the debate on nature as 'infrastructure' (Chatzimentor et al., 2020; Nelson & Bigger, 2022), and defining it as "a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services" (European Commission, 2013), covering terrestrial or marine areas. Adopting both strategies was important for coastal regions as they aim to address biodiversity loss, enhance ecosystem services, and promote the nature's role as an essential infrastructure in terrestrial and marine areas.

In 2012, the Rio+20 conference reaffirmed the importance of sustainable development, focusing on the need for a green economy, poverty eradication and the development of an institutional framework for sustainable development. The conference also launched a process to develop a set of Sustainable Development Goals (SDGs), which the United Nations General Assembly later adopted in 2015. The SDGs cover many issues, including poverty reduction, access to education and healthcare, gender equality, sustainable cities and communities, climate action, and biodiversity conservation. Additionally, in 2015, 197 countries ratified the Paris Agreement, setting out a framework for action to keep global warming well below 2 degrees Celsius above pre-industrial levels while pursuing efforts to limit the temperature increase to 1.5 degrees Celsius. In response to the climate crisis, in 2020, the European Union approved the European Green Deal, a strategy for the European Union to become the first climate-neutral continent by 2050. The Biodiversity Strategy 2030 also plays a relevant role in the EU climate change mitigation strategy, aiming to establish a vast network of protected areas on sea and land. The strategy emphasises ecosystem restoration, the creation of well-managed protected areas, sustainable use of natural resources, and the integration of biodiversity considerations across sectors. By promoting sustainable agriculture, fisheries, and forestry practices, reducing pollution, and combating invasive species, the strategy seeks to ensure the health of ecosystems and their vital role in supporting human well-being and the coastal region's overall sustainability.

While progress has been made since 1950, several challenges persist, and governance is discussed as one of the significant challenges of the XXI century (Burch et al., 2019). Various governance models exist, and coastal governance encompasses all the discussions related to the planning and management of the coastal zone. The need to address the coastal zone as a socio-ecological system is recognised, and the global scale is assumed to be the most relevant in addressing the societal challenges created by the climate crisis (Pinho, 2020; Schlüter et al., 2020b). Ecosystem-based management still prevails (Pittman & Armitage, 2016), but the research and policy focus have shifted to maritime spatial planning, the blue economy, and the blue growth. On the interface between land and sea, soft engineering and nature-based solutions dominate, aligning with the current environmental agenda in Europe.

### 7.3.2 A brief overview of coastal, landscape, environmental and spatial planning institutions and actor's co-evolution in Portugal

#### *7.3.2.1 Phase 1 | 1950-1973 – The planning and conservation impulse*

On the Portuguese coastline, the first stage of the tourist occupation occurred at the end of the 19th century, leading to its progressive transformation (de Freitas, 2007; de Freitas, 2010). The hygienic benefits of sea bathing significantly increased the number of bathers and the demand for social infrastructures for leisure along the coast, especially north of the Tagus River (de Freitas, 2007; de Freitas, 2010). As early as 1864, King D. Luís I recognised the coastal zone as a common good, introducing the instrument of "Public Maritime Domain" through the decree of December 31, 1864. The law stated that the margins of maritime, fluvial, and lake water navigable or floating were subject to State ownership, being this one of the oldest international laws regarding coastal zone protection (Ferrão & Ramos, 2006). With several amendments, the genesis of the law has persisted until today, effectively protecting this strip of land from urban developments.

Until the 1950s, the two founding policy lines in Portugal were agroforestry and urban planning, in which agricultural and forest engineers, civil engineers and architects played dominant roles (Campos & Ferrão, 2018). A significant event that occurred before the 1950s was in 1926, when Portugal's political power changed from a republican parliamentary to an authoritarian regime, resulting in significant changes in public planning policies, strengthening the State's vision and power for controlling the expansion of urban areas (Campos & Ferrão, 2018; Pinho, 1985), with several implications for the Portuguese coast, as it will be discussed shortly.

Between 1950 and 1974, Portugal experienced intensified migration patterns, both internal (rural exodus towards the coastal areas and major cities) and external (emigration), accentuating regional inequalities. This was the beginning of the European process of coastalization (Lagarias & Stratigea, 2023) in Portugal. Additionally, the State promoted an urban-industrial model that contributed to urban sprawl and exacerbated these patterns until today. In 1944, the Directorate-General for Urbanisation Services (DGSU) was established. Two relevant initiatives that ended up contributing to chaotic urban expansion across the territory particularly in coastal areas, were the "*Provisional Urban Development Plan"* (1946) and the *"Urban Allotment Operations"* (1965) (Campos & Ferrão, 2018). The first plan was a technical plan that did not require formal approval, was not legally binding or public, and, as a result, most of the largest Portuguese cities expanded at this time without proper planning or regulation (Campos & Ferrão, 2018). The second law allowed property owners to develop urban projects in rural areas, where municipalities had no legal competencies, leading to the rise of clandestine areas without urban infrastructures (Campos & Ferrão, 2018). At this time, the majority of the Portuguese coastline was considered rural. As a result, many illegal developments arose, as the coastal zone became even more attractive to private investors, leading to a significant increase in environmental degradation, particularly after the 1970s.

During this phase, landscape planning and management were mainly practised by landscape architects led by Professor Caldeira Cabral (Andresen & Castel-Branco, 1993). In 1942, Francisco Caldeira Cabral established the Autonomous Course in Landscape Architecture at the Higher Institute of Agronomy after completing his curricular training in landscape architecture in Berlin (Antunes et al., 2022). Landscape planning and management at that time reflected its German influence and Caldeira Cabral's relationships with landscape architects from around the world through his involvement as Vice-President (1960-1962) and President (1962-1966) of the International Federation of Landscape Architects (IFLA) (Antunes et al., 2022). In Birli (2016, p. 156) research, it is emphasised that Francisco Caldeira Cabral "*may be seen as the first example of knowledge transfer from one country to another and an early form of transnational cooperation in landscape architecture education with one university providing knowledge for the foundation of another university*". Caldeira Cabral's efforts

led to the formal establishment of the landscape architecture profession in Portugal in 1942. His mentorship subsequently shaped two generations of landscape architects, who had a significant influence on various activities in the public and private sectors, such as the modern design of parks and gardens, the design of the green structure at several scales, the landscape integration of infrastructures and large equipments, as well as the preservation or planning of landscapes and nature conservation (Andresen, 2001, 2003; Pinto, 2014). Pinto (2014) systematised the written legacy of Francisco Caldeira Cabral to contribute to the development of the theoretical discourse in the emergence of landscape architecture in Portugal, thereby influencing subsequent generations. Building on the authors' results, we synthesized the main ideas (Table 8) of each theme and subtopic identified by Pinto (2014), as these ideas will become fundamental to understanding several of the institutions developed in the next phase by former students of Francisco Caldeira Cabral.

**Table 8** Main ideas of Francisco Caldeira Cabral written legacy (synthesised, adapted and translated by the authors based on Pinto (2014))

| Theme | Subtopic | Main ideas |
|---|---|---|
| Theme 1 – Landscape architecture: education and profession | Subtopic 1.1. Landscape architecture: education | a) Landscape architecture is connected both to arts and agronomy. |
| | | b) Landscape architecture recognises the importance of practical knowledge in the profession. |
| | | c) Landscape architecture must develop multidisciplinary approaches. |
| | | d) Landscape architecture embraces participatory design project approaches to reflect the needs, preferences and vision of the stakeholders. |
| | Subtopic 1.2. Landscape architecture: profession | a) The landscape should serve the total well-being of men, ensuring its maintenance across generations and the conservation of natural heritage. |
| | | b) Landscape architecture works with living material and understands four dimensions – the three dimensional-space and time. |
| | | c) Landscape architecture operates in several fields of action, across scales, but one of the most relevant is the rural landscape, which must be conserved, renewed and reconstructed. |
| | | d) Landscape architecture is a political art due to the responsibility of human action in the landscape. |
| Theme 2 – Landscape planning and landscape balance | Subtopic 2.1. The elements of the landscape | a) The landscape is a "living organism", where all elements are interdependent, possessing a structure where the relief is fundamental for the biophysical equilibrium. This is attributed to its influence in the hydrological patterns, creation of microclimates and ecological niches, soil formation, as well as its contribution to aesthetical appeal and recreational opportunities. |
| | | b) The woodland, the hedge, and the tree are fundamental to the continnum naturale, and for the maintance of the balance of the landscape. |
| | Subtopic 2.2. Landscape planning | a) Landscape plans should ensure the reasonable use of the landscape by considering together, in addition to the immediate aspects of agricultural, urban, and industrial use, the aspects of biological balance, the conservation of beauty, historical elements, and human comfort. |
| | | b) Landscape planning considers the landscape as a whole, while also acknowledging the significance of detailed interventions as complementary elements that address specific aspects within the broader landscape vision. |
| | | c) Landscape planning embody the principles of landscape differentiation, compartmentalisation, and integrated planning. |
| | | d) The survival of humanity depends on the rural landscape; therefore, the value of soil for agriculture must be recognised as a fundamental planning principle. |
| | | e) The continuum naturale is fundamental for landscape planning. |
| | Subtopic 2.3. Intervention problems in the landscape | a) Landscape change is inevitable, but sudden and drastic changes in the landscape can have adverse consequences. |
| | | b) Landscape interventions must design with nature, rather than arbitrary changing it. |
| | | c) Landscape interventions must respect the character of each landscape and site, as well as the pre-existing elements. Understanding landscape suitability is essential for effective interventions to achieve the biophysical equilibrium of the landscape. |

| Theme | Subtopic | Main ideas |
|---|---|---|
| Theme 3 - Nature conservation and landscape preservation | Subtopic 3.1. Nature conservation and natural resources | a) Nature conservation is "the ongoing action of correction and compensation aimed to achieving landscape equilibrium" (...) "it's no longer a matter of conserving, but creating a new landscape" (Pinto, 2014 quoting Caldeira-Cabral (1955)). |
| | | b) Despite the relevance of national parks in preserving the traditional Portuguese landscape, the planning and conservation of the landscape should extend to the entire national territory, focusing on the restoration and enhancement of both natural and cultural elements within these landscapes. |
| | | c) The conservation and evolution of landscapes should be based on four fundamental principles: continuity, elasticity, meandering, and intensification. |
| | | d) Homeostasis and variety are fundamental for the continuum naturale. |
| | Subtopic 3.2. Protection of the rural landscape | a) Agricultural activity plays a crucial role in the conservation of nature and natural resources. |
| | | b) Agriculture and farmers play a prominent role as agriculture serves as the source of sustenance, and the rural world is perceived as a physical support for the human biocenosis. |
| | | c) The equilibrium of subsistence agriculture must be safeguarded as it introduces continuity and diversity of complementary activities (woodlands, shrublands, vineyards, orchards, dryland, and irrigated land) into the Portuguese landscape, particularly in the North. |
| | | d) The landscape is the expression of the community that creates it; it embodies the cultural identity of a country, particularly evident in its rural landscape. |
| Theme 4 – The art of gardens | Subtopic 4.1. The art of gardens | a) Landscape architecture in Portugal must advocate for the renewal of the Portuguese garden, grounded in its traditional features while providing a contemporary design. |
| | | b) Gardens and the landscape are interconnected as "the garden is not just an extension of the house, it's even more of a link between the house and the landscape" (Pinto, 2014 quoting Caldeira-Cabral (1941)). |
| | | c) Historical gardens must be preserved while considering both their past significance and their relevance for the future. |



Until the 1970s, their landscape planning and management activities played an important role in public bodies and were closely linked to nature conservation. In fact, in 1958, a "Landscape Architecture Department" was created within the DGSU with three regional sections (North, Centre and South of Portugal) to coordinate urban architecture development with landscape architecture design.

Although this research focuses primarily on legislation development, it is relevant to be aware of some fundamental reports developed during this period, which are essential for understanding the legislative evolution. For example, Andresen et al. (2005) emphasise that in 1960, the Minister created a commission inside the DGSU to define norms to protect Portugal's landscape values. The report "Landscape Protection" was presented in 1962 by the same institution. Andresen et al. (2005) claim that its definitions and norms are predecessors of the national network of Protected Areas, the National Ecological Reserve, and the National Agricultural Reserve. Furthermore, in 1967, the "Algarve's Landscape Planning - Preliminary Study" was presented, highlighting the need to consider landscape protection and enhancement as a basis for regional planning. Here, the landscape is not only considered for its aesthetic value but also for the interrelationship between the physical, cultural, economic, and environmental aspects in its multiple relationships resulting from successive human interventions. Magalhães (2001) highlights that the methodology used was innovative, following McHarg's (1969) "Design with Nature" principles. In 1968, "Landscape Architecture Department" evolved into a "Landscape Planning Service" with four sections (North, Centre, Lisbon and South of Portugal) focusing on characterising rural landscapes and setting planning and management objectives (de Araújo, 2009). Landscape architects were trying to incorporate landscape planning principles into spatial planning practices to protect and enhance the cultural characteristics of the Portuguese landscape.

Before the creation of landscape architecture as a profession, and despite the already influential figure of Francisco Caldeira Cabral in the Portuguese environmental movement, forest engineers also played a significant role in the establishment of the nature protectionist movement in Portugal. They were influenced by the "wilderness model" (protected areas free from human disturbance) of the American National Parks (Pinto & Partidário, 2012). In fact, as early as 1937, several forest engineers presented the first proposal for establishing Protected Areas in Portugal, but it did not succeed. However, in 1948, they took a relevant step forward by founding the first Portuguese

environmental non-governmental organisation, known as "*Liga para a Protecção da Natureza*" (LPN). This organisation conducted the first inventories of Portugal's natural heritage, which ultimately contributed to the establishment of many of the current protected areas in the country (Pinto & Partidário, 2012).

During that time, and despite its efforts, LPN faced challenges in influencing the dictatorial regime to implement protected areas. Pinto and Partidário (2012), quoting Soromenho-Marques (1998), justified this difficulty by pointing to high illiteracy rates, lack of environmental awareness and political repression prevailing in the country.

Furthermore, it is relevant to highlight that as early as 1957, Professor Santos Júnior took the initiative to set up the first Portuguese area dedicated to nature conservation, known as the Mindelo Ornithological Reserve, located in Vila do Conde coastal municipality, approximately 30 km from Porto, Portugal. The Reserve was established due to its ecological importance in protecting migratory birds (Velo-Antón, 2020).

In 1969, Marcelo Caetano replaced António Salazar as Prime Minister, ushering in a new generation of decision-makers with a "development-driven" vision of society based on economic theory (Campos & Ferrão, 2018; Pinho, 1985). This marked a shift in policy focus, and regional planning emerged as a prominent strategy. This Third National Development Plan (1968-1973) adopted a regional policy approach inspired by France's regional development policy *(aménagement du territoire)* (Campos & Ferrão, 2018). The plan aimed to restore balance in the urban system and reorganise industrial activities on a supra-municipal scale (Pinho, 1985). To pursue this regional policy, the State introduced the *"Urban Development Plans for Territorial Areas"* (Pinho, 1985). However, these plans did not fully incorporate a territorial perspective, as they primarily focused on urban agglomerations and their contiguous *"green belt areas"* (Campos & Ferrão, 2018). In many coastal municipalities, planning continued to focus solely on urban areas, leaving the rural ones aside without planning or environmental considerations.

During the Fourth Development Plan (1974-1979), spatial planning became a key objective in correcting regional imbalances (Pinho, 1985). However, the democratic revolution that occurred on 25 April 1974 brought about significant political changes, and the plan was never implemented. The revolution marked a new era in Portuguese history, leading to important transformations in policies and governance that will be discussed in phase 2.



To gain access to international organisations, the Government participated in the European Year of Nature Conservation in 1970 and the Stockholm Conference of the Environment in 1972. As a result of the pressure exerted by national and international players during Portugal's participation, the first national legislation for nature protection was enacted in the early 1970s, enabling the creation of Protected Areas (Decree-Law 9/70) (Pinto & Partidário, 2012). This led to a confrontation between disciplinary and professional classes. Forest engineers advocated for the *"Wilderness Model"*, creating categories such as National Parks and Nature Reserves categories, which emphasise preserving the wilderness and minimising human activities (Pinto & Partidário, 2012).

Landscape architects argued that this model was incompatible with the Portuguese landscape reality because Portugal's landscape was strongly shaped by traditional agro-pastoral activities. They proposed a new paradigm influenced by the "new" German model, where popular initiatives would focus on conserving the cultural landscape instead of returning nature to its original status (Pinto & Partidário, 2012). This approach aimed to preserve and protect established farming systems and villages as integral parts of traditional rural landscapes and was mainly associated with the Protected Landscape and Natural Park categories. However, it could also include the National Park designation (Pinto & Partidário, 2012).

As an outcome of these debates, the Peneda-Gerês National Park was established in 1971, following the arguments of forest engineers, and managed by the Forestry Services as a national symbol of nature conservation. Notably, the Mindelo Ornithological Reserve, created in 1957, was not included in the Protected Areas established by this new legislation, and its recognition would only come years later in the democratic period in 2009.

Also, in 1971, Portugal took significant steps towards recognising the environment as an independent public policy by establishing the National Environmental Commission (CNA) as the first organic expression of this policy (Pinho, 1985; Soromenho-Marques, 1998). The same year saw the publication of the first *"National Report in Problems related to the Environment"* by CNA, which highlighted environmental issues and concerns in the country. The State also implemented protective measures by establishing a public protection strip of 50 meters along the coastline as a public maritime domain and extending 30 meters deep seaward (DL 468/71). This created an *"adjacent zone"* with restricted occupation, emphasising the public and accessible use of the coastal zone.

However, coordinating institutions and stakeholders for coastal planning and management faced challenges during this time (Schmidt et al., 2013). A top-down and authoritarian approach prevailed, with a primary goal of *"holding the line"*, adopting an engineering-oriented perspective that largely overlooked environmental concerns. The Navy and Ports General Directorate (1971) had significant control and autonomy over coastal management and defence, with limited consideration for environmental protection.

Figure 3 summarises the governance path in Portugal up to 1974, showcasing the most relevant international or European events and policies that influenced its country's development, along with the inclusion of the relevant event of 1864 that marked the beginning of the recognition of the Portuguese coastline as a common and public good. The figure illustrates the development of coastal, landscape, environmental and spatial planning institutions. The main goal is to highlight key policies and influential events that shaped the country's approach to the governance of the coastal region during this period.

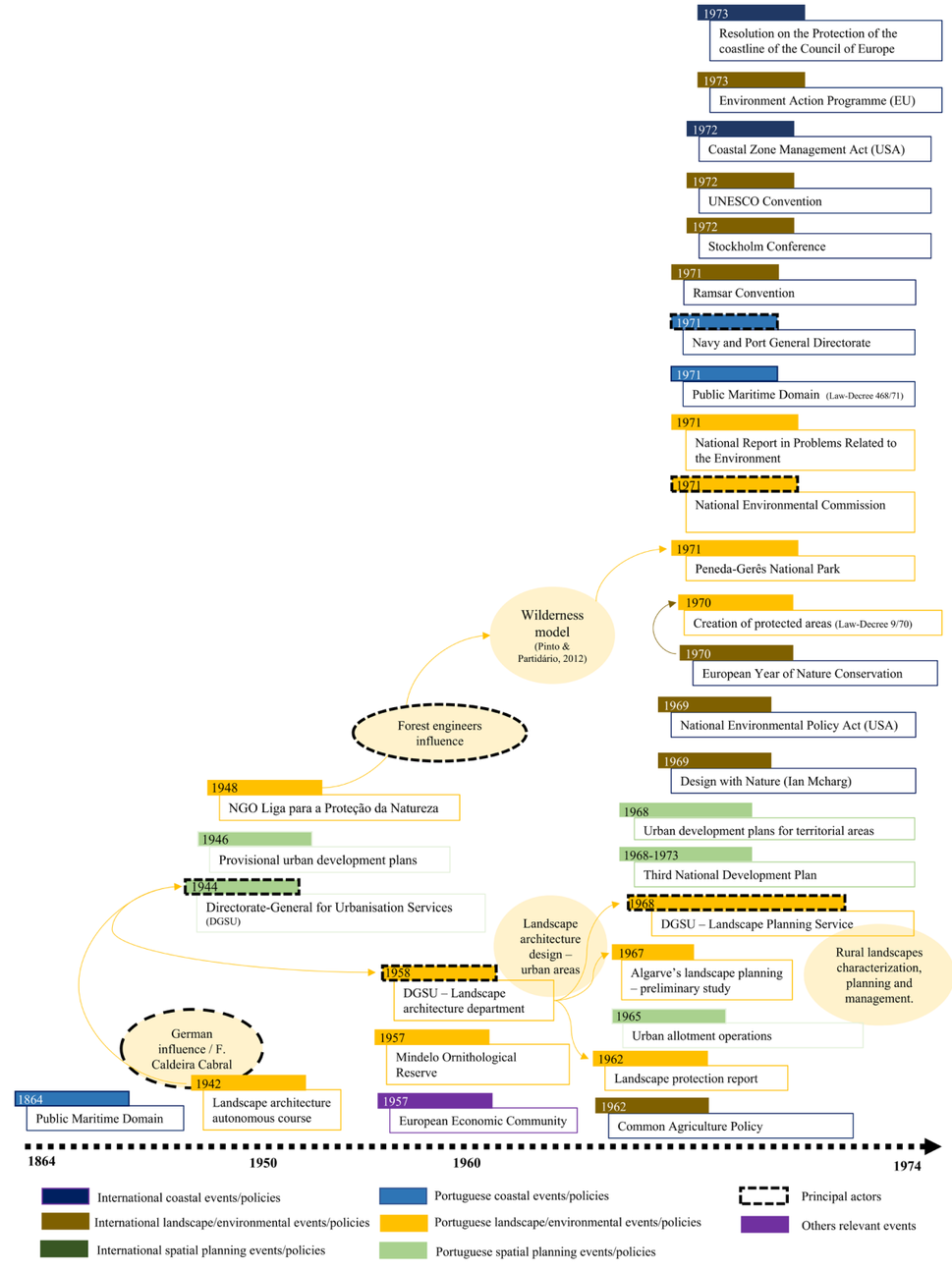


**Figure 3** Governance path in Portugal between 1950 and 1974. The figure illustrates the development of Portugal's coastal, landscape, environmental and spatial, identifying the key institutions and influential events that shaped the country's approach to the governance of the coastal region during this period

#### *7.3.2.2 Phase 2 | 1974-1985 | Democratisation, the recognition of coastal risk and the emergence of environmental and landscape policies*

Due to the dictatorial regime, the environmental movement only gained momentum in Portugal after the revolution of 1974. Landscape architects played a crucial role during this period, pioneering the integration of ecological and cultural principles into the design, planning, and public policy (Andresen, 2003; Campos & Ferrão, 2018).

In 1976, the Portuguese new Constitution was approved, marking a significant turning point. For the first time, environmental and nature conservation received official recognition, and the involvement of local communities and citizens in public life was emphasised. Landscape architect Gonçalo Ribeiro Telles, a former student of Francisco Caldeira Cabral, was among those who contributed to the new Constitution, particularly to article 66º. This article recognised that *"everyone has the right to a humane, healthy and ecologically balanced living environment and the duty to defend it"* (n.º 1, article 66º). The article also mandated the State to pursue *"spatial planning in order to build biologically balanced landscapes"* (n.º 2, b, article 66º). Additionally, the concept of "Planning Regions" was introduced for national economic planning purposes (Pinho, 1985). However, due to the lack of political will and consensus, the implementation of proper regional authorities have been postponed to date, reinforcing the centralised power of the State.

In 1975, environmental and landscape planning in Portugal witnessed the establishment of its governance model. The new democratic Government took a significant step by creating the first State Under Secretariat for the Environment (Decree-Law 550/75), with Gonçalo Ribeiro Telles appointed "Under-Secretary of State for the Environment". This marked a pivotal moment as the National Service of Parks, Reserves and Landscape Heritage was also formed under this decree (Decree-Law 550/75). The preamble stated that *"the environmental policy to be promoted in Portugal should therefore be concerned, on the one hand, with the organisation of spaces and the planning of the landscape in accordance with ecological, social and cultural criteria and, on the other, with responding to the challenge posed by current technological possibilities, demographic growth and the new realities of occupying physical space."* This demonstrated a comprehensive approach towards environmental and landscape planning. Despite these developments, the management of most protected areas created before this period continued to be handled by the Forestry Services (Pinto & Partidário, 2012).



The establishment of the National Service of Parks, Reserves and Landscape Heritage brought together a diverse team led by landscape architects[18], drawing inspiration from the German Natural Parks and Protected Landscapes. This team aimed to move away from the *"wilderness model"* and embrace the *"landscape model"*, which emphasised not only conservation but also social and economic development (Pinto & Partidário, 2012). Their visionary approach significantly influenced the creation of a new law for the Protected Areas, known as Decree-Law 613/76. This legislation introduced innovative categories such as *"natural parks"* and *"protected landscapes"*, reflecting the team's knowledge in reconciling conservation and development goals (Pinho, 1985; Pinto & Partidário, 2012). The preamble of the law emphasised that "nature conservation, the protection of landscapes and sites, the rational management of natural resources and the safeguarding of their capacity for renewal" should be integrated into spatial planning. This integrated approach, advocated by the first generation of landscape architects deeply influenced by Francisco Caldeira Cabral's ideas, aimed to encompass all factors influencing the environment (Andresen, 2001). By emphasising the landscape model and integrating various aspects of environmental management and planning, they sought a comprehensive and sustainable approach to address the country's environmental challenges. Furthermore, Decree-Law 613/76 recognised the need to complement the dominant economic development and urbanisation aspects of regional planning. To achieve that, it called for introducing the of *"concepts and criteria for safeguarding and rationally managing natural resources, extending the intentions of nature conservation and landscape protection"*. The law not only introduced new protected areas categories, but it also advanced with the need to define *"areas that particularly guarantee the biological balance of the regional landscape"* (article 3º), in particular, Special Ecological Areas[19]; Special Agricultural or Forestry Areas[20]; Degraded Areas to be Rehabilitated[21]; and Underground Reserve Areas[22]. These innovative concepts paved the way for some of the most relevant landscape instruments still in

18 The landscape architect Fernando Santos Pessoas was the first presidente of the National Service of Parks, Reserves and Landscape Heritage.

19 Areas of high ecological value, both in terms of productivity and the nature and quality of the products, in which the maintenance of fertility and the capacity for renewal of natural resources and which guarantee the biological balance of the regional landscape must be ensured.

20 Areas of high agricultural or forestry value, both in terms of the biomass produced and the nature and quality of the products, where the maintenance of fertility should be ensured. They are, therefore, areas where certain agricultural and forestry developments are a priority and which guarantee the biological balance of the regional landscape.

21 Areas where the soil or vegetation has been destroyed and require special measures for their restoration with a view to utilisation to be determined by national and regional programme.

22 Areas with available resources, minerals or aquifers, in the subsoil, which it is important to safeguard for appropriate use.

place today. The Decree-Law 613/76 played a significant role in inspiring the study conducted by the landscape architect Ilídio de Araújo on the *"Landscape recognition of the coastal zone between Caminha and Cortegaça"* (1977-78). This study was exceptionally rare for its time because it delved into understanding and recognising the coastal landscape, taking into account its ecological, social and cultural aspects. However, it was never implemented, and the reasons are not documented.

Pinto and Partidário (2012) conducted research that revealed the opportunistic nature of establishing protected areas during this time. The National Service of Parks, Reserves and Landscape Heritage was driven by the urgent need to protect and enhance areas threatened by unsustainable and illegal construction. Although the selection process for potential protected areas lacked extensive fieldwork and a systematic approach to identifying areas with higher landscape or natural values, they could pursue their goal justified by the need to stop illegal developments. Pinto and Partidário (2012) found that the policy of designating areas as National Parks was interrupted after the Revolution of 1974, unlike most other European countries that continued to establish various types of Protected Areas. Currently, Portugal only has one National Park, the Peneda-Gerês National Park created in 1971. In the coastal zone, Schmidt et al. (2013, p. 317) highlighted that after 1974, the proliferation of illegal construction was seen as a *"newly attained citizenship rights"* even in areas integrated into the public maritime domain, due to an *"anti-rule mentality"* (Schmidt, 2008). Despite these challenges, several protected areas were established in the coastal zone during this period.

The revolution also brought significant changes to the local governance, with the election of local democratic municipal bodies through direct and universal suffrage, replacing the previous practice of being appointed by the central Government. This shift played a crucial role in driving territorial, economic, environmental and social transformation at a local level, which continues to influence the present day (Campos & Ferrão, 2018; Pinho, 1985). Despite these positive changes, spatial planning remains highly centralised by the Government and by the DGPU, which *"preserved intact its bureaucratic centralism and technical control prerogatives inherited from the previous regime"* (Campos & Ferrão, 2018, p. 572). In 1979, the State established the Regional Development Commissions. However, their capacity to assume more significant responsibilities as decentralised regional planning bodies was hindered until the DGPU regional directorates reduced central services (Campos & Ferrão, 2018; Pinho, 1985).



In the early 1980s, *"as a reaction to the chaotic sprawl of urbanisation of the previous decades"* (Campos & Ferrão, 2018, p. 575), four relevant instruments were introduced: the National Agricultural Reserve (Decree-Law 451/82), the National Ecological Reserve (Decree-Law 321/83), the Municipal Director Plan (Decree-Law 208/82) and the Regional Spatial Plans (Decree-Law 338/83) (Pinho, 1985). The National Ecological Reserve and the National Agricultural Reserve were based on the principles of the *"special ecological areas"* and the *"special agricultural or forestry areas"* outlined in Decree-Law 613/76, although these were not spatially identified (Andresen et al., 2005). The National Agricultural Reserve included *"the soils with the greatest aptitude for the production of agricultural goods indispensable for national supply, for the full development of agriculture and for the balance and stability of the landscape"* (article 1). The National Ecological Reserve included *"all areas essential to the ecological stability of the environment and the rational use of natural resources, with a view to proper land use planning"*, namely the coastal ecosystems[23] and the interior ecosystems. In both national reserves, urban development and building were prohibited. These laws were critical in halting soil degradation and preserving the landscape's character, safeguarding its biophysical structure and suitability. In some instances, permits could be granted under stringent technical and administrative procedures (Campos & Ferrão, 2018). The creation of these instruments faced opposition from municipalities due to their restrictive construction limitations. The regulation of the National Ecological Reserve would only be established in 1990 (Decree-Law 193/90) (Schmidt et al., 2013). Another relevant instrument introduced was the Municipal Director Plan, enabling municipalities to plan and design their entire territory for the first time (Pinho, 1985). However, full implementation of these new plans only occurred after Portugal acceded to the European Economic Community in 1986. The Regional Spatial Plans aimed to counterbalance the dominance of economic development and urbanisation criteria that had characterised regional planning from 1968 to 1974 by valuing natural, and environmental resources and landscapes (Campos & Ferrão, 2018).

In 1983, the Ministry of Quality of Life was established with the objective of *"promote and collaborate in the actions necessary to protect and improve the environment, including the management of natural resources, the correct development of human landscapes and the definition and control of parameters and levels that characterise environmental quality"*

23 The coastal ecosystems included: beaches; first and second dune bordering the sea; cliffs; where there are no dunes or cliffs, a strip of 500 m beyond the maximum line of the rough sea-shore; Estuaries and estuaries, encompassing a band 100 m beyond the maximum living-water beach line; Islands, islets and rocks emersed in the sea along the coastline.

(Law Decree 49/83). As part of this reorganisation, the National Service of Parks, Reserves and Landscape Heritage was replaced by the National Service of Parks, Reserves and Nature Conservation /Law Decree 49/83). According to Pinto and Partidário (2012, p. 794), this change indicated a shift in conceptual focus from the *"landscape model"* to the *"nature conservation model"* because *"the main priority for the establishment and management of protected areas gradually moved from the conservation of traditional agricultural landscapes and associated cultural patrimony to the broader objective of nature conservation"*.

Figure 4 provides an overview of Portugal's governance trajectory from 1974 to 1985. The main objective is to highlight significant international and European events and policies that impacted the nation's progress. The figure reveals the evolution of coastal, landscape, environmental, and spatial planning institutions.

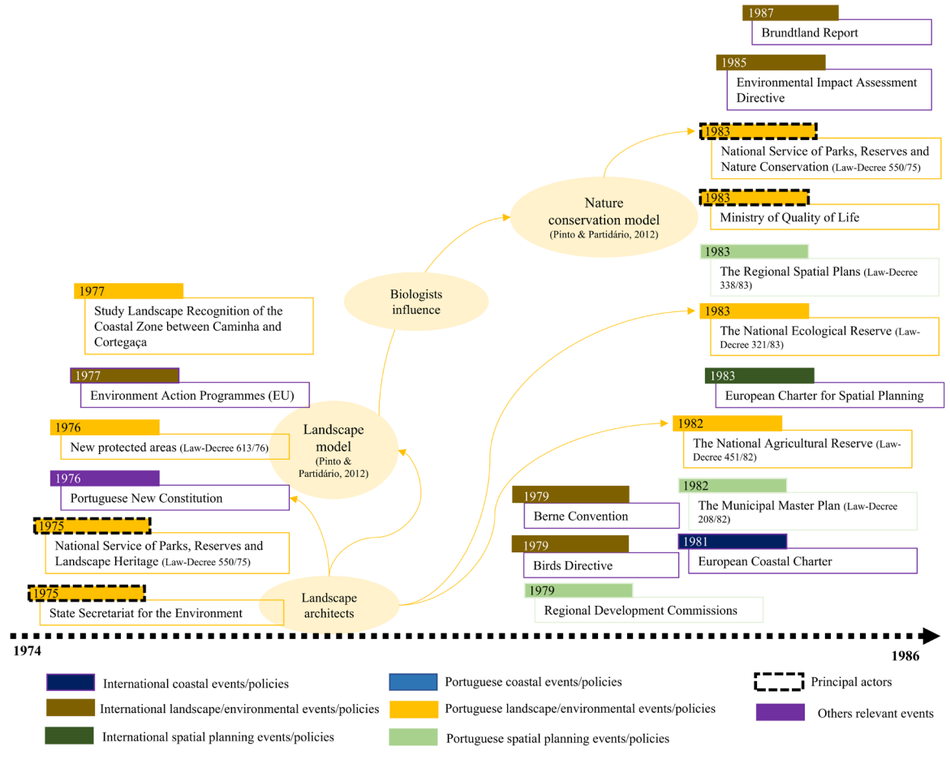


**Figure 4** Governance path between 1974 and 1986. The figure illustrates the development of Portugal's coastal, landscape, environmental and spatial, identifying the key institutions and influential events that shaped the country's approach to the governance of the coastal region during this period



#### *7.3.2.3 Phase 3 | 1986 - Today | The consolidation of environmental policies, the loss of the holistic landscape perspective, and the emergence of climate policies and the sea as an object of planning*

On the 1st January 1986, Portugal acceded to the EEC, which significantly impacted the country's development during this phase. Luís Valente de Oliveira, the Minister responsible for planning and territorial administration from 1985 to 1995, introduced a new era for Portuguese spatial planning policy, emphasising the importance of regional and urban policies (Campos & Ferrão, 2018). Regarding coastal policies, another influential actor was Carlos Pimenta, who served as the Secretary of State for Environment in 1986 and 1987. He took the groundbreaking step of ordering the demolition of illegal dwellings (second homes mostly) in several natural areas along the coastal zone, politically acknowledging the risks posed by coastal development (Schmidt et al., 2013).

In 1987, the Ministry of Planning and Territorial Administration was established, with responsibilities encompassing regional planning and development, local administration and spatial planning, natural resources and the environment, and scientific research. This ministry created the Directorate-General for Spatial Planning and the Directorate-General for Natural Resources, which were formally established in 1992 (Decree-Law 201/92). The Directorate-General for Natural Resources took over jurisdiction on the coast, replacing the Ports Directorate jurisdiction, except for harbours or coastal areas with protected status, which continued to be managed by the National Service of Parks, Reserves and Nature Conservation. The Directorate-General for Natural Resources took the lead in proposing and promoting measures to prevent environmental degradation and landscape restoration as part of its core activities.

Under the influence of Valente de Oliveira, the Municipal Director Plan became mandatory for all municipalities across the country (Decree-Law 69/90). Failure to complete the plan would result in restricted access to projects financed by the first Community Support Framework (1989-1993), and the inability to expropriate land for public use (Campos & Ferrão, 2018). As a result, during the 1990s, every municipality completed its director plan. However, there was a shortage of qualified planning experts, and the newfound political legitimacy and power of municipalities led to a renewed focus on urban territorial dominance. Campos and Ferrão (2018, p. 576) argue that the

plans had *"limited strategic and programmatic vision, with a predominantly regulatory nature and mainly focused in "urban areas" where "rural areas were (still) not planned in an integrated and coherent way with the same degree of depth and clarity as the urban areas"*. During this period, geographers emerged as a new group of professionals involved in the development of Municipal Director Plans (Campos & Ferrão, 2018). Despite the completion of these plans, their actual implementation primarily began after 1995 (Schmidt et al., 2013). Until then, construction in the coastal zone continued to expand without significant restrictions, despite previous attempts to regulate its occupation (Schmidt et al., 2013). The Municipal Director Plan strengthened the autonomy of municipalities and their responsibilities in the field of spatial planning and urbanism, adding 50 new actors (municipalities) in coastal governance under the responsibility of the Ministry of Planning and Territory Administration. In 1984, a Special Commission for the Public Maritime Domain was established, coordinated by the Navy, to assess coastal occupation (Schmidt et al., 2013). This sequence of events demonstrates that the Portuguese coastal municipalities continued to be planned from a sectoral perspective, with few environmental and landscape considerations. The main goal was to plan the coastal urban areas increasing tourism and economic opportunities, without acknowledging the destruction of these fragile and dynamic landscapes or considering the interrelationships between the different parts of the socio-ecological system.

During this period, the environmental policy in Portugal gained greater autonomy and representation at the ministerial level with the establishment of the Ministry of Environment and Natural Resources in 1987. Additionally, Portugal's integration into the European Union facilitated the growth of national environmental policies, leading to the strengthening of the State central services in this respect (Campos & Ferrão, 2018). This period also witnessed a rapid expansion of non-governmental organizations actively engaged in raising public awareness about environmental issues and spatial planning.

In 1987, in line with International and European environmental demands, the first Environmental Act (Law 11/87) was enacted under the political supervision of Carlos Pimenta, preceding Gonçalo Ribeiro Telles. This legislation was strongly influenced by the theoretical foundations and operative concepts advocated by Francisco Caldeira Cabral's school of landscape architecture legacy. This law recognised the right *"to a humane, ecologically balanced environment"* (article 2.º) for all citizens. For the first time, it introduced the concept of landscape[24] as a legal concept, identifying it as a cultural component that should be the object of disciplinary measures to enhance the quality of life. The law made clear the distinction between landscape, environment[25], and nature conservation[26] and emphasised the need to preserve and enhance the "continuum naturale[27]", which can be considered a precursor to the contemporary concept of green infrastructure (Corgo, 2021). The law also introduced several foundational concepts and interventional instruments such as habitats, carrying capacity, use-payer, and environmental impact assessment (Campos & Ferrão, 2018). The first Environmental Act designated the National Ecological and Agricultural Reserves and the "National Nature Conservation Strategy" (to be developed) as environmental and spatial planning policy instruments. It emphasised that *"the existence of an environment that is conducive to people's health and well-being and to the social and cultural development of communities, as well as to an improved quality of life"* (article 4.º) requires the adopting of various measures, where spatial planning, landscape planning and nature conservation played a central role. The law acknowledged the significance of implementing and regulating a continuous National Network of Protected Areas. As a result of the Environment Act, a new National Environmental Institute was planned to carry out and expand the functions of the National Commission on the Environment, established nearly 15 years earlier (Campos & Ferrão, 2018). However, this measure was never implemented.

In 1990, the National Ecological Reserve was established through the Decree-Law 93/90 with the aim of creating *"a basic and diversified biophysical structure which, by conditioning the use of areas with specific ecological characteristics, guarantees the protection of ecosystems and the continuation and intensification of biological processes indispensable to the balanced framing of human activities"* (article 1). This approach sought to maintain many of its economic, social and cultural values, as emphasised in the European Charter for Spatial Planning. However, sixteen

24 "Landscape is the geographical, ecological and aesthetic unity resulting from man's action and Nature's reaction. It is primitive when man's action is minimal and natural when human action is decisive, while maintaining a biological balance, physical stability and ecological dynamics" (c, number 2, article 5.º).

25 Environment is the totality of the physical, chemical, biological systems and their relationships, as well as of the economic, social and cultural factors having a direct or indirect, mediated or immediate effect on living beings and the quality of human life (a, number 2, article 5.º).

26 Nature Conservation is the management of the human use of nature in order to permanently enable maximum profitability compatible with the maintenance of the regeneration capacity of all living resources (f, number 2, article 5.º).

27 Continuum naturale is the continuous system of natural occurrences which support wildlife and the maintenance of genetic potential and which contribute to the equilibrium and stability of the territory (d, number 2, article 5.º).

years later, in 2006, significant changes were made in the National Ecological Reserve through the Decree-Law 180/2006. This revision included provisions allowing for certain uses and actions that would not endanger the persistence of the resources, values and ecological processes initially intended to be preserved by the National Ecological Reserve. These modifications introduced greater flexibility while still safeguarding the essential ecological aspects of that warranted protection.

Also, in 1990, the Portuguese government adopted the European Coastal Charter and issued Decree-Law 302/90, outlining regulations for a coastal strip of 2 kilometres. While landscape considerations were mentioned as factors for integrating buildings with more than two floors, the focus was primarily on other aspects of development. Later, in 1993, the Water National Institute marked a significant shift in coastal policies. Plans to construct groyne along the coast were halted in favour of adopting soft engineering solutions (Schmidt et al., 2013). The same year, Coastal Zone Management Plans were introduced through Decree-Law 309/93, encompassing nine stretches of the Continental Portugal coast and applying to a coastal strip of 500 meters. The regional delegations of the Ministry of Environment had jurisdiction over the first 50 meters of the public maritime domain, while the municipalities were responsible for the following 450 meters, with the Nature Conservation Institute holding jurisdiction of protected coastal areas. These plans aimed to regulate uses and activities in the coastal zone, ensuring the preservation of its biophysical integrity, enhancing the coastal zone, and conserving environmental and landscape values. In 1995, a significant legal development occurred with the introduction of a new type of plan, the so-called "Special Spatial Plan" (Decree-Law 151/95), which aimed to protect and enhance environmentally sensitive and significant areas, like coastal areas, public reservoirs, and nature parks and reserves (Campos & Ferrão, 2018). Coastal Zone Management Plans were legally prioritised over all others, including Municipal Director Plans, excluding harbours jurisdiction areas. However, due to a delay of ten years in their implementation, numerous construction rights were already approved, leading to continuous urbanisation in the coastal zone (Schmidt et al., 2013). The coastal zone management plans faced various challenges, including a lack of reliable data, weak coordination among numerous responsible actors, and the exclusion of the harbours (Veloso-Gomes & Taveira-Pinto, 2003a). Furthermore, in 1994, the Directorate-General for Spatial Planning was extinguished and replaced by the Directorate-General for Spatial Planning and Urban Development (Decree-Law 271/94). This move was motivated by the recognition of the necessity for a new entity capable of formulate national and regional policy proposals and effectively engaging with European conterparts on matters concerning spatial planning and urban development. However, landscape planning was not adequately considered in this restructuring process.

In 1993, the Portuguese government established the "Institute of Nature Conservation" (Decree-Law 193/93), as a successor to the National Service for Parks, Reserves and Nature Conservation. The new agency became a part of the Ministry of Environment and Natural Resources. During the same year, the country introduced the National Network System of Protected Areas (Decree-Law 19/93), which opened the possibility of creating Marine Protected Areas. The legal support for establishing Marine Protected Areas was officially enacted only in 1998 (Decree-Law 227/98). In this period, the category of *"protected landscapes"* was reduced to the regional and local level, focusing on biophysical and aesthetic aspects instead of the holistic concept adopted in 1976. The law also introduced the need to develop a spatial plan for the categories "national park", " natural reserve", and "natural park". The previously introduced concepts of "Special Ecological Areas", "Special Agricultural or Forestry Areas", "Degraded Areas to be Rehabilitated", and "Underground Reserve Areas" were eliminated. On the other hand, the instruments of the National Ecological and Agriculture Reserves were already in place, although their relationship with the National Network System of Protected Areas was not explored or even mentioned. In 1999, Portugal integrated the Natura 2000 into its legal system (Decree-Law 140/99). Subsequently, in 2001, the Government presented the Nature Conservation and Biodiversity Strategy (Resolution of the Council of Ministers 152/2001). This policy is assumed to be a Nature and Biodiversity Conservation Policy, recognising the need to integrate nature conservation policies into other policies. These two legal pieces mark the transition to the "Biodiversity model", which introduces the concept of biodiversity and the notion of representativeness (Pinto & Partidário, 2012). The authors also concluded that the Natura 2000 directive brought more systematic knowledge of the natural values existing in Portugal. As a result, biologists would steadily become the most relevant professional actors in the following legislation (Pinto & Partidário, 2012). Later, in 2008, Decree-Law 142/2008 established the "Fundamental Network for Nature Conservation", comprising the National Network System of Protected Areas (Protected Areas, Natura 2000, other relevant areas assumed in international agreements) and continuity areas

(Public Hydric Domain, the National Ecological Reserve and the National Agricultural Reserve). The category of *"protected landscapes"* on a national scale was reintroduced, emphasising the recognition of landscape as a natural value. The focus shifted towards conserving or enhancing biodiversity, and the concept of ecosystem services was introduced. The requirement to develop a spatial plan was limited to the national or natural park, while it became optional for natural reserves or protected landscapes. Subsequently, in 2015, it was clarified that if these four categories are on a national scale, they must develop a Special Spatial Plan (Decree-law 80/2015). This paradigm shift also had repercussions on the main actors. In 2007, the State established the Institute of Nature Conservation and Biodiversity (Decree-Law 136/2007) within the Ministry of Environment, Spatial Planning and Regional Development, demonstrating the political importance of nature conservation and biodiversity.

During 1998-1999, the spatial planning and urbanism policies in Portugal underwent significant changes, largely influenced by the ESDP in 1999. As a result, spatial planning and urbanism became fully independent public policies regulated by the Spatial and Urban Planning Policy Act (LBPOTU, Law 48/1998), which was further regulated by the Decree-Law 380/99 (RJIGT) (Campos & Ferrão, 2018). Under this new framework, the planning system was organized into three main levels: national, regional and local. According to Campos and Ferrão (2018, p. 581), *"a key outcome of this law was the materialisation of the strategic and programmatic dimension of the planning system through the preparation of the main "territorial development plans""* such as the First National Policy Programme (2007) and the Regional Spatial Planning Programmes, which were developed between 2007 and 2011. The framework law for spatial planning continue to consider the Coastal Zone Management Plans at the top of the hierarchy as Special Plans, along with the Protected Areas Plans and the Public Water Catchment Areas Plans. However, Schmidt et al. (2013) highlighted that this legal option *"only started a "war" of competencies between local, regional and national institutions"*. Regarding the concept of landscape, the law assumes it as an element for visual integration or the relevance of cultural landscapes that should be protected and enhanced without explicitly defining how. The Decree-Law 380/99 identifies various territorial and natural resources that the territorial management instruments must consider. However, the landscape itself is not considered an asset, despite encompassing various natural resources and values, such as the agricultural and forestry areas, the ecological structure, architectural and archaeological heritage, coastal and

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waterfronts, protected areas, or the hydrographic network. The framework defined that the Regional Spatial Planning Programmes must identify "landscape units", emphasising the significance of landscape characterisation and the need to identify the "Regional Structure of Environmental Protection and Enhancement"[28]. At the municipal level, the Decree-Law 380/99 established the concept of ecological structure as the *"areas, values and systems fundamental to the protection and enhancement of the environment in rural and urban areas, namely the ecological reserve areas"* (article 14º). However, it never explains its relationship with the National Ecological Reserve. Regarding the National Agricultural Reserve, the law recognised that these areas are crucial for landscape enhancement.

At a political level, in 1999, the Government recognised the significance of spatial planning in guiding sustainable development and established the Ministry of Environment and Spatial Planning, which remained in operation until 2019. Throughout this period, the Ministry experienced changes in accordance with the political leadership, but environmental and planning policies continued under the purview of the same Minister. In line with the Rio Declaration, the National Council on the Environment and Sustainable Development (CNADS) was created in 1998 to address global issues through local actions. The Government also introduced a new policy for the Littoral in the same year (Resolution of the Council of Ministers 86/98), clarifying policy lines and intervention purposes for this sensitive area. The policy primarily focused on dunes protection, beach and parking regulations, sanitation infrastructure, and urban sprawl control. However, the concept of landscape was only mentioned as a value to be safeguarded in protected areas. Also, the need to consider risks in spatial planning has become more evident than ever before. The Littoral Programme aimed to improve the administrative and legal system of coastal governance. However, according to Schmidt et al. (2013), quoting Carneiro (2007), the practical outcomes were minimal, and the Programme lacked strong political backing, as it was not strategically oriented. In 2000, the Polis Programme (Resolution of the Council of Ministers 26/2000) was introduced as a programme for urban regeneration and environmental enhancement of Portuguese cities. The Polis Programme initiated several significant projects on coastal waterfronts (Partidário & Correia, 2004), but it *"overlapp[ed] with the institutions already on the field, changing and delaying plans* [Coastal Zone Management Plans]" (Schmidt et al., 2013, p. 318). In 2003, the Finisterra Programme (Resolution of the Council of Ministers 22/2003) advocated for a Framework Law for the Coast, including the jurisdiction of harbours in the coastal system governance, to achieve integrated coastal management policies. The Finisterra Programme recognised the need to operate at two levels: one defining integrated and strategic policies aligned with European policies on integrated coastal management and another implementing measures outlined in Coastal Zone Management Plans. The Programme also emphasised the necessity for monitoring measures, coastal defence and demolitions, environmental qualification, and integration and articulation of coastal legislation with other sectoral policies and actors. The landscape was mentioned as an element to be protected due to its cultural and/or touristic value. Schmidt et al. (2013, p. 319) criticised the lack of policy clarity, stating that in 2006, the Programme *"was "reorientated" to focus on the "reestablishment of legality" (….) it finally resulted in the creation of an information system for the coastline (SIARL), despite some confusion over the institutional support and framing of the mission group"*. When established in 2003, the Finisterra Programme, as referred to before, aimed to support the implementation of a Framework Law for the Coast, intending to strenghten coastal governance. However, its focus somehow shifted, leading to the less ambitious development of a GIS information system named SIARL. This system was created to monitor and track illegal constructions along the coast, enabling authorities to manage and respond to unauthorized development more effectively. Finally, in 2009, the National Strategy for Integrated Coastal Zone Management (Resolution of the Council of Ministers 82/2009) was presented following international and European guidelines. The Strategy addressed coastal management, defence, and monitoring, introducing the need for adaptive management of the socio-ecological system based on a new institutional governance model. In this model, the State assumed most of the responsibility and control over the regulation, financing and management of coastal zones, requiring the establishment of a single agency for coastal management as part of the Framework Law for the Coast (Veloso-Gomes et al., 2008a; Veloso Gomes, 2011). The landscape was once again considered a holistic entity that should be equally integrated into coastal planning and management policies. Despite the relevance and the expectations of the scientific and technical community, the Strategy faced challenges due to a *"lack of reliable political will and difficult coordination with institutions and stakeholders"* (Schmidt et al., 2013, p. 319), leading to its non-implementation. In 2012, a crucial decree (Decree-law 159/2012) was published, recognising the need for integrated and adaptive coastal zone management, defining that harbour

28 Concept similar to a green infrastructure.

jurisdiction areas should be included in Coastal Zone Management Plans. It also stipulated that the terrestrial protection zone of those plans could be extended to 1000m to protect coastal biophysical systems located beyond the current 500m coastal strip.

In 2005, Portugal ratified the Council of Europe Landscape Convention through Decree-Law 4/2005, while also transposing the Water Framework Directive of the European Commission via Decree-Law 58/2005. Unlike some other member-states that adapted their governance systems to accommodate the Council of Europe Landscape Convention principles (De Montis, 2014, 2016), Portugal's governance system remained largely unchanged. The Directorate-General for Spatial Planning and Urban Development was made responsible for the implementation of the Council of Europe Landscape Convention. In 2015, following the Convention principles and the recommendations of the First National Policy Programme (2007), Portugal approved a National Policy on Architecture and Landscape (Resolution of the Council of Ministers 45/2015). This policy acknowledges the significance of architecture and landscape in the country's cultural, economic and environmental sustainability, as well as their impact on their citizens' well-being and quality of life. However, the policy mainly presented a diagnosis without specific measures to alter the institutional framework concerning landscape governance. During this period, other initiatives were developed, such as the "National Landscape Character Assessment" for Continental Portugal (Cancela-d'Abreu et al., 2004; Pinto-Correia et al., 2001) and Azores (2005), aimed at supporting planning strategies, instruments or sectoral policies with a greater impact on the landscape. Additionally, there were reports that provided guidance on how to integrate landscape and Council of Europe Landscape Convention principles into Municipal Director Plans (Cancela d'Abreu & Oliveira, 2011; Oliveira, 2019). However, those initiatives were not legally binding. Regarding the Water Directive, it was transposed and adapted to the Portuguese legal system and reality. A significant contribution was the creation of five Regional Hydrographical Administrations, which assumed the coastal and river basin management as the primary unit for its planning and management. This led to *"a radical reformulation of water governance in Portugal, involving re-scaling, shifts in competencies and transposition of requirements concerning cost recovery, monitoring and participation"* (Thiel & Egerton, 2011, p. 397). This represented a novel approach to addressing coastal zone planning and management by integrating these plans within a broader river basin management framework. Indeed, the nine Coastal Zone Management Plans were merged, aligning with the boundaries of the five river basin districts. This new agency architecture was considered a significant step towards the regionalisation of Portugal, which has been a controversial topic mentioned in the country's Constitution, but has not been implemented yet (Thiel & Egerton, 2011). However, in 2012, this measure was reversed due to the economic crisis and the austerity program negotiated with the Troika, leading to the creation of a new agency to optimise resources, the National Environmental Agency (Decree-Law 56/2012). This extinguished the Regional Hydrographical Administrations and the Water National Institute (among others), reinforcing highly centralised decision-making on water, coastal, and environmental policies. Following the Central Administration Reduction and Improvement Plan, several institutions underwent changes. For instance, the Directorate-General for Spatial Planning and Urban Development, the Portuguese Geographic Institute, and the Coordinating Office of the Finisterra Programme were merged, leading to the establishment of the Directorate-General for the Territory (Decree-Law 30/2012). This institution is currently responsible for implementing the Council of Europe Landscape Convention in Portugal. Moreover, the Institute of Nature Conservation and Biodiversity was merged with the Permanent Forest Fund, resulting in the new Institute of Nature Conservation and Forestry. This new agency combined the management and conservation of nature and biodiversity with the regulation of forestry activities. In the aftermath of the devasting 2017 wildfires (Turco et al., 2019), with more than 120 human lives lost, the need to shift from fire suppression to fire prevention was recognised. A sectoral view of the mitigation problem, focusing on landscape management rather than solely on forests, was acknowledged (Canadas et al., 2023), leading to the creation of several laws, including the Landscape Transformation Programme (Resolution of the Council of Ministers 49/2020) and the framework for landscape transformation (Decree-Law 28-A/2020).

In 2008, the National Ecological Reserve underwent significant changes align with other legal regimes, particularly the Water Law. The existing diploma that governed the National Ecological Reserve was revoked, and a thorough and comprehensive review was conducted to introduce transparent, objective, and harmonised criteria for its application at the national level, aiming to address the dissatisfaction among actorswho perceived it as a hindrance to economic development (Andresen et al., 2005; Magalhães, 2001). The law refined the typology of areas to be included in the National Ecological Reserve, outlining their respective functions and/or significance for conservation purposes. The

delimitation process of the National Ecological Reserve started to occur on two levels (Decree-Law 166/2008). Firstly, at a strategic level, both national and regional, coordinated with the National Policy Programme and with the Regional Spatial Planning Programmes, particularly the Regional Structure of Environmental Protection and Enhancement. Secondly, at an operational level, on which the delimitation of the different categories would take place, and it was integrated into Municipal Director Plans. This legal change shifted the responsibility of drawing the National Ecological Reserve to the municipalities, overseen by the Regional Coordination and Development Commissions, which had previously been responsible for this task. In 2012, national and regional strategic guidelines were published (Resolution of the Council of Ministers 81/2012, updated by the Ministerial Order 336/2019). The preamble of the law stated that the original objectives for creating the National Ecological Reserve had lost practical relevance, leading to entropies and dysfunctions in the spatial planning system. Consequently, the law proposed that the National Ecological Reserve should become part of a new Sectoral Plan for Prevention and Risk Reduction (to be developed in the future). Furthermore, the law introduced new criteria for the delimitation of the reserve.

In 2014, The Portuguese government carried out a comprehensive legislative reform on several environmental and spatial planning laws. Alongside the institution's reformulation, the government also reformed the first Environmental Act (Law 11/87), the Spatial and Urban Planning Policy Act (LBPOTU, Law 48/1998), and the Decree-Law 380/99, which regulated LBPOTU. For this research scope, the most significant change observed in the Environmental Act (Law 19/2014) is that the concept of landscape shifted from being considered a cultural component to being recognised as a natural component, with its importance focusing on aesthetic and cultural values. The previous concepts introduced in 1987, such as landscape, environment, nature conservation and *continuum naturale*, were eliminated, and the environmental and spatial planning policy instruments were no longer identified in this framework. Instead, water and the ocean were designated separate natural components that require protection. The law also emphasised the need to coordinate the Environment Law with integrated coastal zone management and policies for the marine environment, water resources and territory. Regarding the spatial planning laws (Law 31/2014 and Decree-Law 80/2015), although the Council of Europe Landscape Convention was already ratified and the National Policy on Architecture and Landscape was also enforced, these laws did not introduce any significant changes besides creating a new level of intervention, the intermunicipal level, and decentralising the power of the coastal management plans from the central State to the municipalities. The Coastal Zone Management Plans were renamed as Coastal Zone Management Programmes, assuming a strategic dimension and only defining guiding principles for safeguarding the natural resources and values and protecting the risk areas. The State continues to establish the strategy for the coastal zone, but all the laws affecting private rights and the citizens can only take place under the scope of Municipal Director Plans. Also, in 2014, the Foundations of Policy for Maritime Spatial Planning and Management were approved (Law 17/2014). The sea became an object of planning, introducing Maritime Spatial Plans and following European directives without any references to the landscape or its character assessment (Gkoltsiou & Siakavara, 2022). The geographical jurisdiction of Maritime Spatial Plans overlap with the Coastal Zone Management Programmes, adding even more complexity to the coastal zone governance system. As a result of the 2014's storm events (Hércules and Stephanie), the government created a new working group to develop an in-depth reflection on coastal governance in climate change scenarios. However, the majority of the results and suggestions (Santos et al., 2014) have not been implemented yet.

As stated by Campos and Ferrão (2018), the inclusion of climate change in Portuguese legislation was influenced by global and EU political priorities. In 2010, the National Strategy for Climate Change Adaptation (Resolution of the Council of Ministers 24/2010) was approved. However, according to Schmidt et al. (2013, p. 319) the document was "*mainly a diagnosis of the climate issues concerning Portugal (…) [without] any real measures.*" The strategy identified the strategic sectors for developing actions to adapt to climate change effects, with the coastal zone being one of the priorities[29]. The landscape was only mentioned in association with forest management. In 2011, the energy sector was prioritised, leading to the creation of the Ministry of Environment, Spatial Planning and Energy. In 2015, the strategy and its strategic sectors were reviewed and updated (Resolution of the Council of Ministers 56/2015), and the ocean also gained relevance together with the coastal zone[30]. The

29 The other sectors were: 1) Spatial planning and cities; 2) Water resources; 3) Safety of people and property; 4) Health; 5) Energy and industry; 6) Biodiversity; 7) Agriculture, forestry and fisheries; and 8) Tourism.

30 The strategic sectors were updated to: 1) Agriculture; 2) Biodiversity; 3) Economy; 4) Energy; 5) Forests; 6) Saúde Humana; 7) Safety of people and property; 8) Transport and communications; 9) Coastal zone and ocean.

ocean also assumed a relevant position in the new Nature Conservation and Biodiversity Strategy 2030, approved in 2018. The strategy emphasises the significance of the marine environment and aims to promote its conservation and sustainable use, aligning with the United Nations' Sustainable Development Goals. Furthermore, it aims to halt biodiversity loss and the decline of ecosystem services by 2030, by restoring degraded ecosystems, including forests, wetlands, and coastal habitats, to enhance their resilience and capacity to provide ecosystem services. The strategy also seeks to enhance knowledge and capacity among stakeholders and strengthen governance and coordination among public and private actors. The landscape is recognised as a relevant value that needs protection, however, no specific measures are established in this respect.

In 2019, after twenty years of being under the same Ministry, the new government separated the environmental and spatial planning policies and created the Ministry of Environment and Climate Action and the Ministry of Territorial Cohesion. Climate change became a priority of environmental policies and spatial planning to promote territorial cohesion. Recently, Portugal approved its Climate Law (Law 98/2021), with ambitious targets and concrete measures to reduce greenhouse gas emissions, increase the use of renewable energy, improve energy efficiency, promote sustainable transport, prepare for the impacts of climate change, and ensure a just transition to a low-carbon economy. Again, the landscape appears related to sustainable and resilient forestry, and the coastal zone is not even mentioned. The focus is on developing a policy for the sea that protects the marine and coastal environment. In 2019, the relevance of the sea was also assumed at a political level with the creation, for the first time, of the Ministry of the Sea. In 2022, it became the Ministry of Economy and the Sea, making the blue economy's economic relevance more visible.

Figure 5 provides an overview of the governance trajectory in Portugal from 1986 until today, presenting significant international and European events and policies that impacted the country's progress so far. The figure visualises the evolution of institutions dedicated to coastal, landscape, environmental, and spatial planning. the primary purpose is to emphasise pivotal policies and influential occurrences that molded Portugal's approach to coastal region governance during this era.

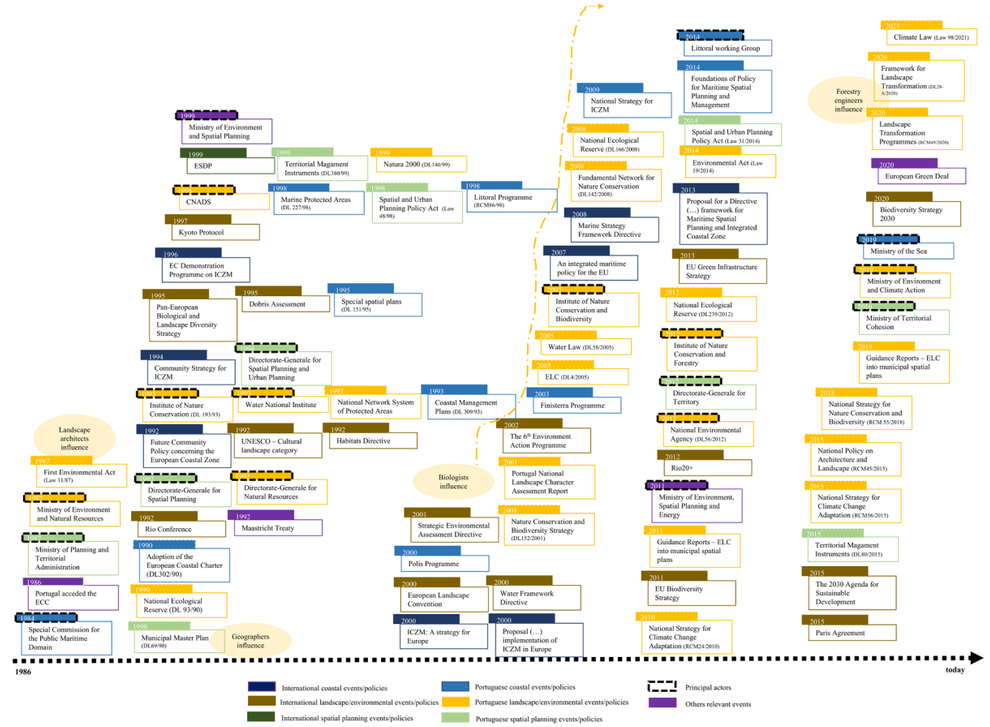



**Figure 5** Governance path between 1986 and today. The figure illustrates the development of Portugal's coastal, landscape, environmental and spatial, identifying the key institutions and influential events that shaped the country's approach to the governance of the coastal region during this period

### 7.3.3 Content analysis of the main Portuguese coastal, landscape, environmental and spatial planning institutions

After tracing the co-evolution of coastal, landscape, environmental and spatial planning institutions, according to Beunen et al. (2015) definition of institutions (and actors), we identified the most relevant ones to be assessed in the content analysis phase (Table 9). The results showed that most institutions (55%) developed since the 1950s are landscape/environmental laws/policies. However, when assessing the content of these institutions, it will be demonstrated that their evolution does not follow the international demands concerning the landscape debate.

**Table 9** List of institutions included in the content analysis

| Period | Phase | Year | | Institutions | Focus |
|---|---|---|---|---|---|
| 1950 - 1974 | The planning and conservation impulse | 1864 | | 1/ Public Maritime Domain (Decree December 31, 1864); | |
| | | 1970 | | 2/ Protected Areas (DL 9/70) | |
| | | 1971 | | 3/ Public Maritime Domain (DL 468/71) | |
| 1974 - 1986 | Democratisation, the recognition of coastal risk and the emergence of environmental and landscape policies | 1976 | | 4/ Portuguese Constitution (1976) | n.a. |
| | | 1976 | | 5/ Protected Areas (DL 613/76) | |
| | | 1982 | | 6/ National Agricultural Reserve (DL 451/82) | |
| | | 1982 | | 7/ Municipal Director Plan (DL 208/82) | |
| | | 1983 | | 8/ National Ecological Reserve (DL 321/83) | |
| | | 1983 | | 9/ Regional spatial plan (DL 338/83) | |
| 1986 - Today | The consolidation of environmental policies, the loss of the holistic landscape perspective, and the emergence of climate policies and the sea as an object of planning | 1987 | | 10/ Environmental Act (Law 11/87) | |
| | | 1990 | | 11/ Municipal Director Plan (DL 69/90) | |
| | | 1990 | | 12/ National Ecological Reserve (DL 93/90) | |
| | | 1990 | | 13/ European Coastal Charter (DL302/90) | |
| | | 1993 | | 14/ Coastal Management Plans (DL 309/93) | |
| | | 1993 | | 15/ National Network System of Protected Areas (DL 19/93) | |
| | | 1995 | | 16/ Special Spatial Plans (DL 151/95) | |
| | | 1998 | | 17/ Marine Protected Areas (DL 227/98) | |
| | | 1998 | | 18/ LBPOTU (Law 48/98) | |
| | | 1998 | | 19/ Littoral Programme (RCM86/98) | |
| | | 1999 | | 20/ Natura 2000 (DL 140/99) | |
| | | 1999 | | 21/ RJIGT (DL 308/99) | |
| | | 2000 | | 22/ Polis Programme (2000) | |
| | | 2001 | | 23/ Natura Conservation and Biodiversity Strategy (RCM 152/2001) | |
| | | 2003 | | 24/ Finisterra Programme (2003) | |
| | | 2005 | | 25/ Council of Europe Landscape Convention (DL4/2005) | |
| | | 2005 | | 26/ Water Law (DL58/2005) | |
| | | 2008 | | 27/ Fundamental Network for Nature Conservation (DL 142/2008) | |
| | | 2008 | | 28/ National Ecological Reserve (2008) | |
| | | 2009 | | 29/ National Strategy for Integrated Coastal Zone Management (2009) | |
| | | 2010 | | 30/ National Strategy for Climate Change Adaptation (RCM 24/2010) | |
| | | 2012 | | 31/ National Ecological Reserve (2012) | |
| | | 2012 | | 32/ Coastal Zone Management Plans (Decree-Law 159/2012) | |
| | | 2014 | | 33/ Environmental Act (Law 19/2014) | |
| | | 2014 | | 34/ LBPOTU (Law 31/2014) | |
| | | 2014 | | 35/ Foundations of Policy for Maritime Spatial Planning and Management (Law 17/2014) | |
| | | 2015 | | 36/ RJIGT (DL 80/2015) | |
| | | 2015 | | 37/ National Policy on Architecture and Landscape (RCM 45/2015) | |
| | | 2015 | | 38/ National Strategy for Climate Change Adaptation (RCM 56/2015) | |
| | | 2018 | | 39/ National Strategy for Nature Conservation and Biodiversity (RCM 55/2018) | |
| | | 2020 | | 40/ Landscape Transformation Programme (RCM 49/2020) | |
| | | 2020 | | 41/ Framework for Landscape Transformation (DL 28-A/2020) | |
| | | 2021 | | 42/ Climate Law (Law 98/2021) | |

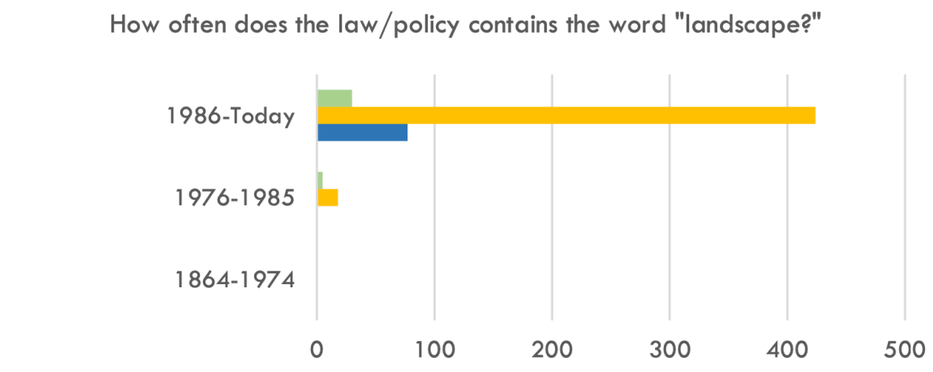
**Legend:** Coastal institutions | Landscape/Environmental institutions | Spatial planning institutions

#### *7.3.3.1 How has the use of the word landscape evolved?*

Most laws assessed (78%) were developed due to the international movement demand, especially after Portugal acceded the EEC. The use of the word landscape has been growing during the analysis period (Figure 6). However, its meaning and how it has been integrated into policies have also been evolving, as it will be discussed further.

It is relevant to understand that the significant grow in the word count after 1986 has mainly resulted from the ratification of the Council of Europe Landscape Convention, the development of the National Policy on Architecture and Landscape, and the recent development of the Landscape Transformation Programme. Otherwise, the count would only rise from 18 (1974-1985) to 119 (1986-today) instead of 424.

Despite the wide range of institutions assessed in the content analysis, no specific law focuses on the governance of the coastal landscape. Instead, a mix of spatial, landscape, environmental, and coastal institutions govern and plan the coastal landscape, mainly from a sectoral perspective.




| | 1864-1974 | 1976-1985 | 1986-Today |
|---|---|---|---|
| Spatial planning institutions | 0 | 5 | 30 |
| Landscape institutions | 0 | 18 | 424 |
| Coastal institutions | 0 | 0 | 77 |

**Figure 6** Results on the evolution of the count of the word landscape

Most institutions address landscape concerning nature conservation, biodiversity, aesthetics, and, more recently, forestry. The landscape policy evolved from an approach that focused primarily on protecting nature. Indeed, it was possible to observe the pattern that Pinto and Partidário (2012) identified regarding the evolution of protected areas legislation in Portugal (Table 10) on the majority of the laws assessed.

**Table 10** Four models for the Portuguese protected areas applied between 1971 and today (adapted from Pinto and Partidário (2012))

| **Period** | 1971 - 1974 | 1975–Early 1980s | Mid 1980s–Late 1990s | Early 2000s–present |
|---|---|---|---|---|
| **Model** | Wilderness model[31] | Landscape model | Nature conservation model | Biodiversity conservation model |

The influence of landscape architects on the landscape model (Pinto & Partidário, 2012) is present in most of the laws developed after 1974, namely their influence on the Portuguese Constitution, on the Decree-law 613/76 on Protected Areas, the National Ecological Reserve, the National Agricultural Reserve, and the first Environmental Act. These laws reflect the holistic concept they advocate and the claim that landscape thinking and planning should be the basis of sustainability planning. All these laws capture the foundational principles advocated by Francisco Caldeira Cabral (Table 8). These principles underscore the importance of understanding landscapes as living organisms with interdependent elements, and the need to consider the intricate relationships between natural, cultural, social, and economic elements within a given area. According to Francisco Caldeira Cabral, instead of approaching planning as a series of isolated actions, landscape-based planning recognises the significance of both natural and cultural values in shaping a place's identity and functionality. It emphasises a long-term vision, and takes a systems approach, focusing on the relationships between different components. Landscape planning also embraces the importance of spatial connectivity and the flows of elements such as water, biodiversity, and people, striving to strike a balance between human needs, development goals, and environmental conservation. At that time, landscape architects advocate that

31 The Wilderness discourses in Portugal can be traced back to the beginning of Phase 1; however, its prominence within environmental institutions was particulary notable between 1971 and 1974.

planning should include all landscape aspects and address all landscapes, designing measures appropriate for different contexts and scales.

With the beginning of the nature conservation model, and later, after Natura 2000 implementation, with the biodiversity conservation model, the way to address landscape changed. Exceptions can be found, specifically, for the ratification law of the Council of Europe Landscape Convention, which precisely incorporates the exact text in the Portuguese legal system, or the National Policy on Architecture and Landscape, which also integrates the Council of Europe Landscape Convention principles.

Even the recently approved Landscape Transformation Programme law presents a thematic landscape context, mainly regarding forestry, despite advocating a broad perspective on the landscape concept. Even though the word landscape is highly present in this law, its concept is mainly related to the biophysical landscape, and with a narrow perspective of the landscape, far from the broader concept advocated today in landscape research.

#### *7.3.3.2 How has the landscape concept evolved?*

In our database, only three laws define the concept of landscape: the first Environmental Act (1987), the Council of Europe Landscape Convention (2005) and the National Policy on Architecture and Landscape (2015). The latter embraces the holistic concept established in the Convention. In 1987, strongly influenced by landscape architects, the Environmental Law also assumed a holistic concept on which the landscape was assumed to be *"the geographical, ecological and aesthetic unity resulting from man's action and Nature's reaction"* (article 5, Law 11/87). This definition is strongly aligned with the Council of Europe Landscape Convention definition, *"landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors"* (Council of Europe, 2000a). Although the Environmental Law does not stress the perception dimension as the Convention does, it highlights its aesthetics, which was already strongly related to landscape perception at that time (Zube et al., 1982).

Although the other laws/policies do not define the concept of landscape, it was possible to deduce from 21 institutions which perspective (Antrop & Van Eetvelde, 2017) was used (Figure 7). Most laws followed a socio-cultural (19,5%) and an aesthetics/visual (17,0%) landscape perspective, recognising that



landscapes are seen as cultural and social constructs that are shaped by human activities, beliefs, and values or emphasising the beauty and meaning in which people see the landscape. The only laws that encompass a holistic perspective (combining all the other perspectives) are the ones previously described in section 3.3.1.. It is relevant to highlight that despite the perspective used and frequency of the word "landscape", most plans only mention it or emphasise the need to safeguard the landscape value or heritage, especially in protected areas. However, they do not define how to achieve its preservation or enhancement. Also, the Council of Europe Landscape Convention principle that all landscape matters despite their value is still not integrated into Portuguese legislation.

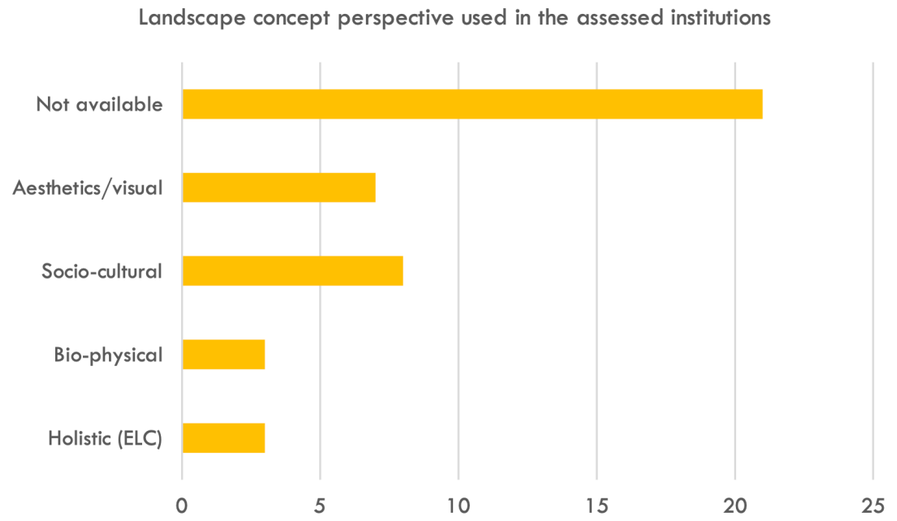



**Figure 7** Results on the question – Which landscape perspective is used?

Along with the analysis of the institutions, other concepts have arisen due to their relevance for coastal governance. In 1976, Decree-Law 613/76, aiming to establish protected areas, introduced several relevant concepts such as the special ecological areas, the special agricultural and forestry areas, the degraded areas to be rehabilitated, and the underground reserve areas. These concepts can be considered predecessors of the National Ecological Reserve and the National Agricultural Reserve, which, later in the 1980s, would have their own legal framework. Both laws became fundamental to safeguard the areas essential for ecological stability and protect the resource soil being conceptualised by landscape architects as a structural element of the landscape. Indeed, these follow the concept of *continuum naturale*, introduced in

Portugal by Francisco Caldeira Cabral (Magalhães, 1993) and later integrated into the Environmental Law by Gonçalo Ribeiro Telles in 1987. The concept refers to a continuous system of natural occurrences that support wildlife and maintain the genetic potential, contributing to the equilibrium and stability of the territory, being also the basis of the concept of "ecological structure", which would be integrated into the spatial planning laws developed in the late 1990s as an instrument for planning the landscape infrastructure at all scales.

Another pertinent aspect is related to the evolving perception of the coastal zone as an area of land influenced by the sea and vice-versa. The evolved definitions have always been from a policy-oriented viewpoint (Kay & Alder, 2005) and do not consider the coastal socio-ecological system boundaries (Table 11). When coastal zone definitions are solely policy-oriented and do not encompass the socio-ecological system, there is a high risk of adopting a fragmented approach that fails to address the interconnectedness of coastal ecosystems and the social, economic, and ecological processes that span across the entire coastal area. The coastal landscape unit concept operates on multi-spatial and multi-temporal scales interconnecting ecological, social, cultural, aesthetic and sensorial levels, recognising the coastal landscape structure, functions and dynamics.

**Table 11** Policy-oriented definition of a coastal area in Portuguese institutions

| Year | Institution | Definition |
|---|---|---|
| 1864 | Public Maritime Domain | Margins of maritime, fluvial and lake water navigable or floating were subject to State ownership |
| 1971 | Public Maritime Domain | Strip of 50 meters and 30 meters depth seaward |
| 1990 | European Coastal Charter | Strip of 2km |
| 1993 | Coastal Zone Management Plans | 50 meters of the public maritime domain and a strip of 450 meters, excluding harbours jurisdiction areas, and 30 meters depth seaward. |
| 2009 | Integrated Coastal Zone Strategy | "Littoral (Litoral)—covering the whole EEZ shoreline and all the terrestrial area influenced directly or indirectly by the sea;<br>Coastal zone (Zona costeira) – the stretch ranging from the 200m depth line to the interior as far as tides, waves or winds reach and have an influence;<br>Coastal Stretch (Orla costeira)—a stretch of coast which is under the direct influence of sea activity;<br>Coastline (Linha de costa) – reference line defined as the intersection between mean height of sea level and land" (Veloso-Gomes et al., 2008b). |
| 2012 | Coastal Zone Management Plans | 50 meters of the public maritime domain and a strip of 450 meters that may be extended to 1000m by the need to protect coastal biophysical systems located beyond the current 500m coastal strip, and 30 meters depth seaward. |



#### *7.3.3.3 On which section is the landscape referred?*

The structure of laws/policies varies significantly, but it is possible to conclude that most plans only mention the landscape in the background or the purpose section. As mentioned, after 1974, and during the landscape architect's influence, the landscape concept and/or the landscape approach were present in the law construction. After the paradigm change from the landscape model to nature conservation, although the landscape is still present and mentioned, it lacks the relevance it had before. The definitions, rules or procedures focus on biodiversity and nature conservation. The coastal institutions follow the same pattern. Although recognising the relevance and quality of Portuguese coastal landscapes, most laws/policies only reinforce the need for landscape characterisation or safeguarding its values or character without establishing specific measures.

Additionally, the laws reinforce the role of outstanding landscapes and do not underline the role of planning and managing ordinary landscapes. This reality also applies to spatial planning institutions. Even after the ratification of the Council of Europe Landscape Convention, no significant changes were introduced in the new legislation produced since 2014. Recently, the Landscape Transformation Programme is another paradigmatic example of using a landscape narrative (Köpsel et al., 2017) that, despite claiming a holistic approach, still presents a dominant discourse on the bio-physical landscape and its influence on fire hazard.

Additionally, most laws do not define landscape instruments, as in other European countries that have ratified the Council of Europe Landscape Convention (De Montis, 2014). Indeed of the 42 institutions assessed, only the National Policy on Architecture and Landscape can be considered a landscape policy document. The Council of Europe Landscape Convention defines a landscape policy as *"an expression by the competent public authorities of general principles, strategies and guidelines that permit the taking of specific measures aimed at the protection, management and planning of landscapes"* (Council of Europe, 2000a). Although its content does not fully meet this definition, other institutions contribute to it, namely the Protected Areas law, the National Ecological Reserve, the National Agricultural Reserve, the National Strategy for Integrated Coastal Zone Management, and the ecological structure concept legally foreseen in the spatial planning legislation. Finally, the content analysis also allowed us to conclude that there was a concern about involving different actors in the law's implementation and assessment from an early stage, despite seldom practice

in the actual implementation of the laws, especially concerning citizens engagement.

## 7.4 Discussion and concluding remarks[32]

In this study, we aimed to determine whether the landscape concept has been integrated into the governance of the coastal region, addressing the lack of empirical discussions on the governance of coastal landscapes in both coastal governance and landscape governance debates. We selected Continental Portugal as our case study and conducted an evolutionary analysis of its principal legislative institutions and actors since 1950, comparing it with developments at the European level. Our findings indicate that the landscape has indeed been integrated into the governance of the coastal region. However, over the analysed time frame, its conceptualisation and the level of integration have been changing, strongly influenced by the role of influential Portuguese actors, their interests, values and stocks of knowledge, and later by the European policy agendas. As discourses on the governance of coastal landscapes in Portugal evolved, governance systems adapted to new perspectives without always acknowledging their implications for the governance system or their impacts on the coastal socio-ecological system. In the following sections, we will delve into the implications of the diachronic analysis presented in section 3 regarding its current significance and relevance for the governance of coastal landscapes within our case study and beyond Portugal.

### 7.4.1 Do European discourses impact the integration of landscape in the governance of the coastal region in Portugal from 1950 to today?

The different phases of European discourses (section 3.1.) have significantly impacted the governance of coastal regions in Portugal while also shaping the integration and understanding of coastal landscapes (section 3.2.). Figure 8 and Figure 9 synthesise the evolution of Europe and Portugal's most relevant coastal and landscape discourses, respectively.

32 This section was originally titled "Discussion and conclusions" in the source material.

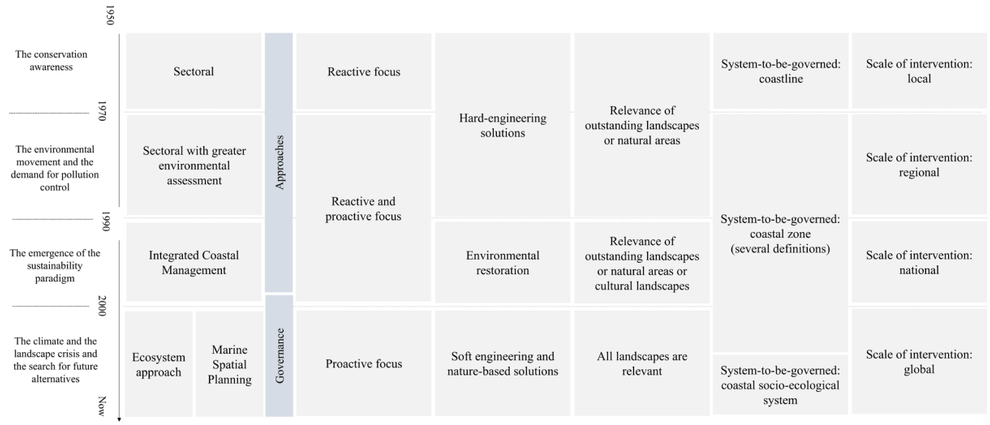



**Figure 8** Synthesises of the evolution of coastal and landscape discourses in the European context

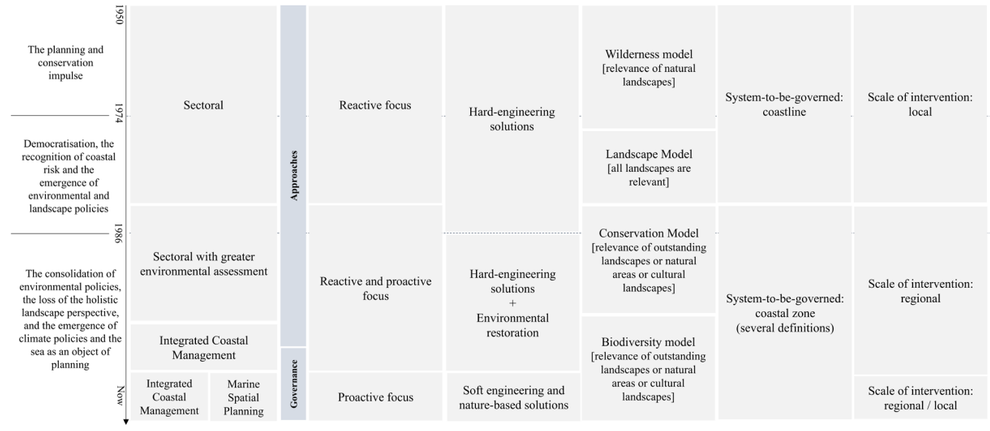



**Figure 9** Synthesises of the evolution of coastal and landscape discourses in Portugal

The findings indicate that although Portugal has generally followed the European discourse trends, the pace of integrating these discourses was, on the one hand, influenced by the authoritarian regime (phase 1 | 1950-1974 – The planning and conservation impulse), which slowed down their integration, and on the other hand, by the accession to the EEC in 1986, which accelerated the incorporation of most discourses. Also, as already mentioned, the internal competition between influential professional actors was crucial for the evolutive pathway of the Portuguese governance of the coastal region and the replacement of one paradigm by another.

The comparison of Figure 8 and Figure 9 reveals that the Portuguese evolution differs from the European pathway in four key aspects, mainly in the current discourses. Firstly, the operationalisation of coastal governance at the European level is now dominated by an ecosystem approach and by marine spatial planning. In the Portuguese context, the integrated coastal management approach still dominates, which is not surprising as this is one of the most politicised approaches for coastal management, mainly in the Global North. Also, as discussed in section 3.2.3., Marine Spatial Planning has also gained relevant notoriety in recent years in Portugal, which is expected to grow due to the ongoing National discussions on the blue economy and the offshore energy transition.

Secondly, as stated in section 3.3., concerning landscape discourse, Portugal's trajectory diverges from European landscape demands, particularly following the Council of Europe Landscape Convention. Landscape thinking's importance has grown in European politics and scientific terms. However, this trend has not been observed in Portugal, where the governance of coastal landscapes predominantly focuses on outstanding natural and cultural coastal landscapes rather than encompassing all coastal landscapes. As previously mentioned, a distinct facet of the Portuguese evolution was the landscape model advocated by landscape architects during phase 2, which has several similarities to the ongoing landscape scientific and political discourse at the European level.

Thirdly, the current debate recognises coastal governance as a complex system that must be analysed, governed and transformed in line with system theory. A system approach involves acknowledging the socio-ecological interrelationships and interdependencies and identifying the leverage points (Meadows, 1999) to intervene. However, Portuguese institutions have not yet incorporated this current discourse on socio-ecological systems into their legislative frameworks.

Finally, the last relevant differences focus on the scale of intervention. Coastal governance operates on multiple scales, from global to local. However, today, the relevance of the global scale is emphasised due to climate change. Climate change necessitates cooperation and action at the global scale for effective mitigation. The effects of climate change on coastal regions do not adhere to national borders, underscoring the importance of assessing the interdependence of impacts. In Portugal, the governance of the coastal region mainly operated on a regional scale. However, since 2014, the changes introduced in the Spatial Planning institutions have led to an increased relevance on the local scale. The legislative pieces assessed do not stress its relation with the transboundary and global scale of coastal problems.

Each of these differences between the current Portuguese and European discourses directly reflects the evolution of the governance of the coastal region in Portugal since 1950, shedding light on the most significant shortcomings that must be addressed to improve the governance of the coastal region and that are now being discussed.

### 7.4.2 What are the most relevant shortcomings in the governance of the coastal region in Portugal?

#### *7.4.2.1 Narrow definition of landscape*

The findings suggest that coastal governance primarily remains a narrow landscape definition in Portugal. Despite Portugal's early establishment of landscape institutions and actors, driven by a holistic landscape conceptualisation, today, coastal landscapes are predominantly valued for their visual and cultural significance. Governance primarily focuses on outstanding coastal landscapes within the legal framework of protected areas.

As previously mentioned, today, scientific debate recognises that the governance of coastal landscapes should encompass all coastal landscapes, particularly everyday landscapes, considering their evolution over time and engaging coastal communities to address the climate and the landscape crisis. Integrating a holistic landscape conceptualisation into the governance of the coastal region offers better prospects for effectively managing and preserving the dynamic of coastal landscapes while considering their ecological, social, cultural, and economic factors. However, this requires new linkages between existing policies and moving beyond political-administrative boundaries.

Reinstating the landscape on the political agenda in Portugal remains particularly challenging given its historical trajectory. The dominant discourses on National institutions centred on biodiversity conservation, the competition among professional experts, and economic forces that persistently overlook the fragility and dynamism of the Portuguese coastal landscape are the aspects that explain the current difficulties in integrating the landscape in the governance of the coastal region, as demanded from Council of Europe Landscape Convention or by current discussions on landscape research.

Future research is needed in Portugal to examine coastal and spatial planning instruments and determine whether similar patterns persist. Further research should also gather empirical evidence from diverse geographical contexts to assess its evolutionary paths to reinforce the governance of coastal landscapes. The analysis of various case studies on the particularities of the landscape's integration in the coastal region's governance and its outcomes can help to tailor possible new configurations of the governance of coastal landscapes.

Another relevant aspect that emerges from our research is the need for the landscape architecture discipline to increase its scientific research because, as demonstrated in Portugal, this professional group has played a crucial role in influencing the governance pathway. Indeed, they were responsible for the most relevant institutions still in place today. Suppose the landscape paradigm has prevailed until today. In that case, it might have produced significant positive changes in the Portuguese coastal landscape. Was this influence limited to Portuguese landscape architecture actors, or has it prevailed in other European or North American countries?

#### *7.4.2.2 Lack of modes of observation*

Our research reveals that the landscape model from the late 70s/80s left several landscape instruments in the subsequent phases of the governance system, such as the National Ecological Reserve, the National Agricultural Reserve and the ecological structure. These landscape instruments and the Protected Areas Network in the coastal zone safeguarded the structure of the coastal socio-ecological system in many Portuguese coastal municipalities.

However, in many cases, powerful actors were able to delay the spatialisation of these landscape instruments, negatively affecting the protection of the coastal landscape character due to an intensive and extensive urban, touristic or economic occupation of the coastal landscape. This occupation increased the coastal risks in several locations, leading to the need to build hard-engineering coastal defences, which, on the other hand, also altered the coastal system. This loop highlights the lack of observation of one decision's effects in a different location, as the coastal governance lacks a system approach perspective and a monitoring system that recognises and assesses what makes coastal landscapes unique. Also, today, this is even more pressing due to the demands for planning the sea, which adds even more pressure on assessing the effects of the policies and actions in two directions – land and sea – and their interdependencies.



Monitoring is fundamental to making informed decisions. The Portuguese Coastal Monitoring Programme (COSMO Programme) consists of collecting, processing and analysing information on the evolution of beaches, dunes, nearshore seabeds and cliffs along the coastline of mainland Portugal. Although monitoring the evolution of the Portuguese coastline is relevant, it is crucial to highlight that coastal governance must encompass a broader perspective than just monitoring coastal risks to ensure that the coastal region is holistically planned and managed. Modes of observation in Portugal must evolve into a new monitoring programme that recognises the fragility and dynamic nature of coastal areas and their interrelationships among the different boundaries and scales.

#### *7.4.2.3 Political-administrative boundaries*

Our research also reveals that Portuguese coastal institutions predominantly adopt a policy-oriented approach to the coastal zone. Our results demonstrated that this approach leads to fragmented and limited governance outcomes, characterised by multiple administrative and political boundaries that fail to acknowledge the evolving boundaries inherent to a dynamic coastal socio-ecological system.

Our analysis reveals an expansion in administrative boundaries in 2014, increasing from three to four levels, now encompassing the national, regional, intermunicipal, and municipal levels. Concurrently, as already said, the number of actors involved in the governance of the coastal region has also grown, and the local actors saw their powers reinforced. By decentralising the authority and decision-making to the municipal level, the regulations and measures can better reflect the local coastal zone's specific needs, characteristics and priorities. However, challenges may have also arisen, such as variations in the level of implementation and enforcement between municipalities, potential conflicts between local actors' interests and broader environmental concerns, and the need for effective coordination and integration among municipalities to ensure coherent coastal planning and management across regions.

In opposition, actors with specific responsibilities for establishing landscape planning and management objectives have shrunk. Presently, the Directorate-General for the Territory is the principal landscape actor in Portugal. Nevertheless, compared with other European countries (De Montis, 2014), limited actions have been taking place, no landscape strategy has been

developed thus far, and there is a lack of a landscape vision and landscape quality objectives for the coastal zone.

The Portuguese case illustrates the importance of moving beyond traditional political-administrative boundaries, a trend also discussed in recent literature on coastal governance (Van Assche et al., 2020a). The debate proposes addressing the coastal zone as a socio-ecological system, recognising its boundaries and the complex interactions between the land and sea. Van Assche et al. (2020a, p. 3) claim that the coastal condition (*"what makes coastal areas unique"*) must be translated into governance terms.

A relevant aspect of the integration of landscape into the governance of the coastal region is that in landscape governance research, the landscape is discussed as a socio-ecological system with the potential to offer advantages for governance. The recognition of the *"landscape as socio-ecological system can facilitate the development of integrated models that conceptualize landscapes as nested sets of co-evolving social and natural subsystems connected through feedbacks, time lags, and cross-scale interactions"* (Hersperger et al., 2021, p. 2339).

If we acknowledge the Council of Europe Landscape Convention definition of a landscape (Council of Europe, 2000a), then a coastal landscape represents a distinct landscape unit whose character results from *"a specific combination of landscape components of an environmental, cultural, perceptive and symbolic nature, as well as with clearly recognisable dynamics that give it an idiosyncrasy that is different from the rest of the territory"* (Nogué et al., 2016b).

We claim that the landscape unit can translate the coastal condition, as the coastal landscape emerges from its context as a differentiated entity. The governance of coastal landscape must be grounded in a holistic landscape concept, understanding that the landscape operates on multi-spatial and multi-temporal scales, interconnecting ecological, social, cultural, aesthetic, and sensory levels. Their biophysical and socioeconomic processes influence coastal landscape structures, functions, and dynamics. However, incorporating the landscape unit into the Portuguese legal system would require a significant shift in policy, legal frameworks, and institutional practices due to the inherent complexity of these conceptualisations and their integration into legal frameworks.

Nonetheless, it is essential to note that when Portugal transposed the Water Framework Directive into its legal system in 2005, the Government established Regional Hydrographical Administrations (see section 3.2.3.). These



administrations were organised based on coastal and river basin management boundaries, which could serve as a starting point for integrating the landscape unit concept into the Portuguese legal framework. Although those agencies were dismantled in 2012 due to resource optimisation, they can serve as a case study to explore how a landscape unit serves as the legal framework.

In addition to the complexities of integrating the landscape unit concept into the legal system, it is also fundamental to recognise the potential parallels with indigenous knowledge or transboundary governance theory. Due to their similarities in approaching governance beyond formal administrative boundaries, the need for more research on these topics and their relation with coastal systems to embrace socio-ecological boundaries in a National legal system is fundamental.

#### *7.4.2.4 Lack of institutions assessment*

Our findings underscore that shifts in European policy trends and internal governance competition between professional actors resulted in the displacement of one paradigm by another. This displacement occurred without any ex-ante or post-assessment that helped make informed decisions and future actions based on the institution's outcomes. In this process, replacing one simplified and absolute truth with another occurred, often without thoroughly contemplating the merits and constraints of the preceding governance arrangements, hindering the establishment of a comprehensive coastal governance system until today.

In the evolution from the wilderness model to the landscape model, to the nature conservation model, to the biodiversity model, it was evident that the prior paradigm was incompletely institutionalised. However, it was also not entirely dismantled, increasing the fragmentation in coastal governance and allowing the occupation of the Portuguese coastal zone until the late 90s without constraints in most rural and peri-urban areas.

It is fundamental to increase empirical research on the outcomes of the governance system in the evolution and sustainability of the coastal region with a specific focus on to what extent the landscape concept integration in the coastal region's governance has impacted its outcomes.

#### *7.4.2.5 Fragmentation and lack of policy integration and coordination*

Coastal governance in Portugal faces challenges of fragmentation, resulting in insufficient policy integration and coordination among diverse institutions and stakeholders responsible for managing the coastal landscape. The complex mixture of interests from several actors and institutions in Portuguese coastal areas leads to a fragmented governance system. This fragmentation manifests as dividing governance into separate components, such as coastal, spatial, marine, and environmental and landscape planning. Each of these components involves contested dynamics, varying viewpoints, jurisdictional differences, and distinct configurations. Consequently, a sectoral perspective prevails, characterised by conflicting priorities and interests among different actors in many situations. The number and diversity of institutions and enforcement mechanisms employed by Portugal prove insufficient in many situations to safeguard and enhance the coastal landscape sustainability.

In the Portuguese context, policy integration and coordination are expected to become even more complex and vital in coastal governance because of the interactions between land and sea. Despite conflict, complexity, and uncertainty are fundamental characteristics of coastal governance, more research is needed to embrace evolved forms of policy integration and transformative change based on this evolutionary knowledge.

#### *7.4.2.6 Lack of a specific coastal actor and institution*

Portugal lacks dedicated coastal actors to address the intricate multi-level governance in coastal regions. Calls for a Framework Law for the Coast have been longstanding demands, but the political will to implement such a law has not been consistent (Santos et al., 2014; Schmidt et al., 2014; Schmidt et al., 2013). Similarly, the landscape lacks a specific actor focused on landscape planning and management, and no dedicated landscape policies have been developed.

Indeed, our findings demonstrated that the governance of the coastal region operates under environmental, spatial or coastal planning or management institutions and actors. Also, the debate highlights the complexity of addressing the interactions between land and the sea, which have different actors with their own jurisdictions, responsibilities and interests, increasing the challenges of governing the coast in two directions. This reality was also present in Portugal, where land and sea have different actors and legislative laws. The separation of actors and institutions responsible for land, sea, landscape and environment has led to a reorientation towards less integration between all the policy domains responsible for safeguarding and enhancing the coastal region.

We argue that our case study confirms findings in recent literature on coastal governance, that a truly coastal governance could help to assuage the impacts of land on the sea, sea on the land, and manage the high pressures on the social-ecological system (Gonçalves & Pinho, 2022; Partelow et al., 2020; Van Assche et al., 2020a).

To overcome this challenge, we claim that Portugal must create dedicated coastal actors at the regional scale founded upon the landscape unit concept. Each coastal landscape unit identified at a regional scale should have its coastal actor responsible for planning and managing the coastal landscape. This new agency could effectively coordinate and harmonise governance efforts, bridging the ecological, social, cultural, and economic aspects. The regional scale can establish the planning strategy, acknowledging its effects on a national and global scale, but also identifying the guidelines that must be coherently developed locally, on a project level, without losing the necessary scale to include the ecological, cultural, social, and aesthetic values and involve coastal communities (Kempenaar & van den Brink, 2018; Neuman & Zonneveld, 2018; Nijhuis et al., 2020). As a result, decision-making processes can become more efficient and streamlined as long as transparency and accountability are guaranteed. It is essential to emphasise that interdisciplinary and transdisciplinary knowledge are fundamental, along with effective stakeholder involvement, facilitating dialogue and collaboration, mediating disputes and conflicts, and developing a long-term vision for the coastal landscape. Dedicated actors at the regional scale can ensure a coordinated and integrated approach to coastal landscape planning and management, taking into account the land, the sea, and the interactions between land and sea. Additionally, such actors necessitate resource allocation, enabling it to prioritise and carry out a long-term vision and strategy for the Portuguese coastal landscape.

Creating such actors in Portugal is probably quite challenging because of the centralised power of the state. Although the Government has been increasing the power of local and regional entities, delegating some authority and responsibilities, the central Government maintains overall control. Also, there

is a lack of political consensus on formalising the 'Planning Regions' predicted in the Portuguese Constitution since 1986, as already explained in section 3.2.2, which would lead to a profound political restructuring of the Government structure, political powers, resource allocations, and policy developments. This challenge is strongly related to the following because political will is often one of the most important aspects behind any governance reform.

#### *7.4.2.7 Limited Political Will*

The Portuguese case illustrates a lack of strong political will to proactively respond and alter the governance system to adapt to societal challenges. Today, coastal and landscape governance are not prioritised on the government's agenda. Coastal and landscape actors are often absent from higher-level political positions. This absence results in an inadequate allocation of resources, limited policy development with a short-term vision, and a sectoral and overexploitation of coastal resources and landscape degradation, increasing the difficulties in adapting to climate change.

The ongoing projects for offshore energy, deep-sea mining, or the increased visibility of Portugal's shoreline on luxury markets with alleged "sustainable" developments that completely change the coastal landscape character or banish local communities are already creating even more tensions between the need for and the barriers for long-term planning and management. A robust political standing is fundamental because new forms of adaptive governance are needed to deal with the new challenges ahead (climate change, sea-level rise, erosion, energy transition), without forgetting the intensification of old threats (urban sprawl, touristic occupation, biodiversity loss, landscape change), as well as the increased complexity of multi-level governance from the global to the local scale.

Raising awareness among policymakers and the public about the value and vulnerability of coastal landscapes can contribute to increasing their priority on the political agenda. Effective public participation and stakeholder engagement processes can help ensure that the governance of the coastal landscape is more inclusive and responsive to societal needs and challenges. If coastal communities are more aware of the relevance of coastal landscapes in their daily life, chances are higher that they will pressure the Government to take action. This awareness acts as a catalyst, motivating communities to advocate for institutions and actors that protect and enhance the coastal region. Otherwise, considering the Portuguese governance path, the probability is that significant changes will only take place if a (new) environmental catastrophe occurs.

More research on power relations, knowledge creation and governing interactions is fundamental, mainly from an evolutionary governance perspective, also addressing the role of political mandates.

#### *7.4.2.8 A call for coastal landscape governance*

While acknowledging the limitations of generalisation from a single case, our research's main implication for coastal governance beyond Portugal is the recognition of the imperative for coastal landscape governance at the European level. This recognition arises from our empirical analysis and the understanding of the pivotal role of landscapes in addressing the intricate and interconnected challenges inherent to coastal regions. The Portuguese evolutionary pathway demonstrates the relevance of prioritising landscape in the governance of the coastal region. However, beyond researching how coastal landscapes are governed, it becomes imperative to reorient our approach towards coastal landscape governance through the lens of the Council of Europe Landscape Convention.

Coastal landscape governance can help reframe how the coastal condition is governed, setting new forms of governance, modes of observation and coordination at different scales. It contributes to integrating land and sea interactions, giving a central stage to coastal communities and their perceptions of their everyday landscapes while acknowledging their biophysical and ecological conditions towards a more hopefully resilient and adaptive coastal future.

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# 8 At the Regional scale

## The governance of the coastal region: evolutionary changes in the conceptualisation and integration of landscape in Portuguese coastal planning institutions


## Abstract

### Context

Coastal landscapes are unique and fragile socio-ecological systems, yet despite political and scientific efforts toward integrated coastal governance, challenges such as fragmented approaches, multiple boundaries, and inadequate policy integration persist. While landscape governance offers significant potential for rethinking coastal governance by emphasising the integrative power of landscapes, many scientific discussions still employ a binary perspective, limiting its full potential. Additionally, research on how the conceptualisation and integration of landscape has evolved in European coastal planning institutions remains scarce.

**Objectives**

This article aims to advance coastal landscape governance research by examining the evolution of the conceptualisation and integration of landscape in Portuguese coastal planning institutions, assessing whether the narrow view found in national laws is reflected at the policy instrument level.

**Methods**

We used multiple explanatory case study research to explore the evolution of the conceptualisation and integration of landscape within Portuguese coastal planning institutions from 1978 to 2021, employing qualitative content analysis.

**Results**

Findings indicate that coastal plans have increasingly failed to use the integrative potential of landscapes fully. This decline is accompanied by a growing tendency to associate landscape valuation with Nature Protected Areas.

Furthermore, the analysed instruments revealed an increase in references to the landscape over time. However, differing conceptualisations of the landscape emerged, with the unexpected finding that a holistic conceptualisation did not always correspond to high levels of integration. Instead, landscape integration primarily focused on aspects such as multifunctionality, connectivity, and fragmentation.

**Conclusions**

Our research underscores the urgent need for more empirical research in coastal landscape governance. From a broader perspective, such research could demonstrate the benefits of leveraging the integrative power of landscapes in coastal governance, potentially contributing to a paradigm shift towards coastal landscape governance.

**Keywords:** Policy changes; Evolutionary Governance Theory; Plan evaluation; Landscape Architecture; Landscape approaches; Integrated Coastal Zone Management.



## 8.1 Introduction

In many coastal countries, the governance of coastal regions has become a prioritised research and political area (Partelow et al., 2020). This prioritisation is due to the process of coastalisation, which involves the increasing migration of populations and activities to coastal areas (Lagarias & Stratigea, 2023). Coastalisation became particularly prominent during the 20th century, intensifying the pressures of human activities on an intrinsically fragile and dynamic socio-ecological system (Schlüter et al., 2019). One notable example of this pressure is the increasing scarcity of intact coastal regions worldwide (Williams et al., 2022), which the authors define as those experiencing relatively low human pressure, a trend also observed in European coastal regions. Additionally, climate change impacts - such as rising sea levels, extreme weather events, inundations, and aggravation of levels of erosion - further threaten most of these regions and the welfare of their inhabitants (IPCC, 2022b). Coastal landscapes are unique, dynamic, and fragile environments shaped by the interplay of natural, cultural, social, and economic factors, with changes occurring over multiple timescales, as well as their symbolic and perceptual significance, making them subject to unique pressures and complex governance challenges.

Despite sustained political and scientific efforts to govern coastal regions from an integrated perspective (Cicin-Sain & Knecht, 1993; Kay & Alder, 2005; Tocco et al., 2024), significant shortcomings persist. These include the prevalence of sectoral or fragmented governance and planning approaches limited by political-administrative boundaries (Pérez-Cayeiro et al., 2019). Other challenges include policy integration and multi-level governance (Eger et al., 2021), as well as the lack of integration between land and sea interactions (Innocenti & Musco, 2023). Furthermore, unstable political and scientific discourses (Flannery & McAteer, 2020), limited economic and financial resources and insufficient attention to the regional scale also hinder coastal governance (Cabana et al., 2023). Increasingly, the importance of involving local communities in decision-making processes related to coastal governance is recognised (Claudet et al., 2024; Van Assche et al., 2020a). Celliers et al. (2023, p. 1419) highlight the necessity of engaging stakeholders with 'agency' in coastal decisions. They define agency as "*the capacity of individuals and collective actors to change the course of events or the outcome of processes*".

A critical issue is the absence of a specific coastal governance arena in many coastal countries. This arena requires institutions (regulations, norms, laws,

policies, and plans) and actors (individuals, groups or organisations, formal or informally) capable of recognising and incorporating the boundaries, dynamics and values of coastal socio-ecological systems into the governance system from an evolutionary perspective (Beunen et al., 2015; Van Assche et al., 2020a). The urgency of climate-related challenges confronting most coastal nations demands a reassessment of our approach to conceptualising and operationalising coastal governance (Schlüter et al., 2020c).

We argue that landscape sustainability science (Wu, 2013, 2021), through the lens of landscape governance debate (Görg, 2007; Kozar et al., 2014; Van Oosten et al., 2021), offers significant potential for revaluating coastal governance, especially its coastal institutions. By using the concept of landscape (Antrop & Van Eetvelde, 2017) as a medium for governance and planning, it can operate across various scales and temporal levels, involving multiple sectors and actors. Landscape governance goes beyond the traditional role of landscape as merely an object of planning and management (Van Rooij et al., 2021). Furthermore, the landscape sustainability science debate highlights the advantages of the contemporary conceptualisation of landscape (Antrop & Van Eetvelde, 2017) in integrative planning and management processes (Hersperger et al., 2020; Van Rooij et al., 2021; Westerink et al., 2017; Wu, 2013). Today, the concept of 'landscape' encompasses not only natural-ecological characteristics but also their socio-cultural identities, thereby contributing to a sense of place (Wu, 2013, 2021). This comprehensive concept is particularly relevant for coastal governance, as it underscores the integrative power of landscapes, the importance of incorporating knowledge of landscape systems, and the role of landscapes in promoting human well-being (Hersperger et al., 2020). Coastal landscape governance builds on landscape governance debate, but its object is the coastal landscape. Several methods exist to identify its boundaries, depending on the scientific discipline (Simensen et al., 2018).

If coastal plans leverage the integrative power of landscapes, they can effectively address sustainability by fostering stakeholder collaboration and incorporating adaptive management to navigate uncertainties (Hersperger et al., 2020). As one of the key strategies for sustainable coastal planning (Creed et al., 2018), adaptive management provides a systematic approach that integrates science, stakeholder engagement, and iterative learning to address the complexities of coastal socio-ecological systems (Tompkins & Adger, 2004). This flexibility is particularly critical in the context of climate change, as it allows coastal plans to respond dynamically to evolving conditions and uncertainties. Grounding these plans in a deep understanding of landscape functioning further recognises coastal landscapes as complex socio-ecological systems, enhancing resilience, multifunctionality, and connectivity, while fostering the interconnectedness of humans and their landscapes (Antrop & Van Eetvelde, 2017; Hanspach et al., 2014; Steiner, 2012). Furthermore, landscapes contribute to human well-being through recreational opportunities, cultural heritage, and community-based stewardship initiatives, ensuring a more comprehensive and sustainable approach to coastal planning (Plieninger & Bieling, 2017; Termorshuizen & Opdam, 2009).

At the European level, the concept of landscape has also evolved significantly. This evolution is evidenced by the Council of Europe Landscape Convention (Council of Europe, 2000b, 2016), which promotes landscape protection, management, and planning among its signatories-countries (Council of Europe, 2000b, 2016). The Convention defines landscape as "*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*" (Council of Europe, 2000b, article 1a). This definition aligns with the current landscape science debate as it recognises the landscape as a complex socio-ecological system reflecting a combination of biophysical, socio-economic, and cultural features (Ahern, 2006; Forman & Godron, 1986; Kristensen & Primdahl, 2020; Wu, 2013). It also acknowledges landscape as a visual, sensorial, aesthetic, and perceptual experience dependent on the perceiver (Nogué & i Font, 2007).

Despite advancements in the conceptualisation of the landscape and the existence of a formal European definition that embraces all landscapes, outstanding and ordinary, recent research has shown that many discussions still frame landscapes in a binary manner - either as nature or culture and as either physical or social constructions (Van Eetvelde & Aagaard Christensen, 2023; Van Eetvelde et al., 2024). These binaries often reinforce a dichotomy that does not fully capture the complex, evolving relationship between human societies and their landscape. In coastal governance, for instance, the binary distinction between land and sea further complicates decision-making and policy development, as coastal landscapes are often framed in terms of either terrestrial or maritime dimensions. The governance of the coastal landscape should move beyond these simplistic dichotomies, nature/culture, physical/social constructions, and land/sea, as they have significant implications for coastal planning and management (Walsh, 2018). These binaries also limit the potential for future coastal landscape imaginaries (Nogué & Wilbrand, 2018) as actors become attached to outdated visions and resist new, more integrated perspectives (Walsh, 2020).

Also, these binary perspectives do not fully capture the nuanced evolution of the conceptualisation of landscapes over time and are likely reflected in the governance of landscapes in many European countries (De Montis, 2014). Consequently, institutions often fail to fully leverage the integrative potential of landscapes, as demonstrated by Hersperger et al. (2020). The authors found that landscape science contributes considerably to European strategic planning. However, most plans fall short of utilising the full integrative potential of the conceptualisation of landscape in terms of governance.

The persistence of a binary perspective on landscapes can significantly impact their governance. For example, in the Wadden Sea, the binary relationship between nature and culture has created challenges, as spatial policies tend to emphasise one aspect over the other, leading to conflicts between conservation and cultural heritage (Egberts, 2019). The author claims that this dichotomy can be overcomed by adopting a landscape-based approach that emphasises the interconnectedness of nature and culture. This approach involves reframing the region as a maritime-agricultural landscape, which captures the dynamic interactions between human activities and the natural environment over time.

Furthermore, this narrow view often results in fragmented or siloed approaches, leading to inadequate policy responses that overlook landscape dynamics and functions. Such an approach can reduce adaptability, increase conflicts, and undermine effective governance. This lack of an integrated perspective is particularly critical for coastal landscapes, which are among the most dynamic and complex environments on the planet. Coastal landscape governance involves managing both land and sea, culture and nature, physical and social elements, frequently with overlapping jurisdictional boundaries and diverse goals and interests from stakeholders.

Despite the relevance of this topic, research specifically addressing changes in landscape conceptualisation within European coastal planning institutions remains scarce, although relevant examples exist (Crawford, 2019; Döring et al., 2021; Egberts, 2019). Recent research (Gonçalves & Pinho, 2024a) confirmed that current national coastal legislation in Portugal is dominated by a narrow view of the landscape, despite Portugal signing the Council of Europe Landscape Convention in 2000 and a holistic understanding of landscape having influenced major environmental laws in the past. Our main goal is to identify and leverage the explanatory power of shifts in landscape thinking within coastal planning to inform future policies for more effective coastal landscape governance in Portugal and, potentially, in other European countries as well. Using explanatory case study research, we seek to explore how the conceptualisation and integration of landscape in coastal planning institutions evolved. Our main goal is to deepen our understanding of how shifts in landscape thinking affect coastal planning to inform future policies for more effective coastal landscape governance in Portugal and potentially other European countries.



## 8.2 Methods

### 8.2.1 Selection of the Case Study and the Coastal Planning Institutions

Portuguese coastal planning institutions are currently divided according to the five NUTS II regions. We selected the Northern Region of Portugal because, in 1978, the landscape architect Ilídio de Araújo developed the study *"Landscape Recognition of the Coastal Zone between Caminha and Cortegaça"* (LRCZCC 77/78), a rare and underexplored applied research work in Portugal. The unit of analysis in our case study is coastal planning institutions, and the time frame spans between 1978 and 2021, as this period encompasses the development of the Plans under analysis (Table 12). A brief description of each Plan and an example of their strategy maps are available in Appendix 2.

It is important to note that the LRCZCC 77/78 was never completed and implemented. However, despite its unfinished state, this early Study remains significant for its landscape perspective on the coastal zone. Additionally, the POOC-CE 2007 was excluded from the content analysis because its 2007 modification focused solely on the so-called *beach plans*, which are not relevant to our research objectives.

**Table 12** Coastal planning institutions developed since 1977 until today

| Issued | Time-horizon | Plan (abbreviation in Portuguese) | | Institution (type) | Area covered (land) | Actor / Authority |
|---|---|---|---|---|---|---|
| 1977/78 | n.a. | Study: Landscape recognition of the coastal zone between Caminha and Cortegaça (1977–78), not concluded and implemented | LRCZCC<br>77/78 | Study / Strategic | Caminha-Cortegaça (3km buffer from the coastline) | Directorate-General for Urbanisation Services (DGSU) – North Region |
| 1999 | 10 years | Coastal Zone Management Plan Caminha-Espinho<br>(Resolution of the Council of Ministers n.º 25/99) | POOC-CE 1999 | Plan / Regulation with binding rules | Caminha-Espinho (0,5km buffer from the coastline) | Ministry of the Environment /<br>Water Institute |
| 2007 | 10 years | [Plan modification] Coastal Zone Management Plan Caminha-Espinho (Resolution of the Council of Ministers n.º 154/2007) | POOC-CE 2007 | Plan / Regulation with binding rules | Caminha-Espinho (0,5km buffer from the coastline) | Ministry of the Environment /<br>Water Institute |
| 2021 | 10 years | [Plan review]<br>Coastal Zone Management Programme Caminha-Espinho<br>(Resolution of the Council of Ministers n.º 111/2021) | POC-CE 2021 | Programme / Strategic | Caminha-Espinho (0,5km -1 km buffer from the coastline) | Ministry of Environment and Climate Action /<br>National Environmental Agency |

### 8.2.2 Content Analysis Framework

After identifying the coastal planning institutions, we conducted a qualitative content analysis (Elo & Kyngäs, 2008). Our analysis focused mainly on the textual elements of the plans, with a comprehensive list of all documents assessed provided in Appendix 4. Each assessment item was recorded according to the framework outlined in Table 13. Our framework was adapted from Hersperger et al. (2020) to our particular case study, building on on Runhaar et al. (2024), Bürgi et al. (2022), Simensen et al. (2018), and Nogué et al. (2016) (for the complete protocol adaptation, see Appendix 3). Hersperger et al. (2020) developed a protocol consisting of 16 questions based on the conceptualisation of four key aspects: (1) Plans leverage the integrative power of landscapes, (2) Plans are grounded in knowledge of landscape functioning, (3) Plans highlight the contribution of landscapes to human well-being, and (4) Plans address landscapes in all main sections, along with their corresponding items. For our case study, we expanded this framework to include additional items, resulting in a total of 24 questions.

As already mentioned, the primary goal was to understand how the conceptualisation and integration of landscape into coastal planning have evolved. While the framework adapted for the content analysis is grounded in contemporary landscape research, it may not fully capture the landscape thinking of 1978, which differed from current European thinking, especially before the adoption of the Council of Europe Landscape Convention (Antrop & Van Eetvelde, 2017). Nevertheless, Gonçalves and Pinho (2024a) have shown that the landscape discourse in Portugal from 1974 to 1986 closely aligns with today's scientific understanding of landscape, particularly in relation to the principles outlined in the Council of Europe Landscape Convention. This alignment reinforces the relevance of applying the adapted framework to historical contexts such as the LRCZCC 77/78, providing a robust foundation for analysing the evolution of landscape integration in coastal planning.

**Table 13** Content analysis framework for assessing the conceptualisation and integration of landscape into Portuguese coastal plans institutions (adapted from Hersperger et al. (2020), based on Runhaar et al. (2024), Bürgi et al. (2022), Simensen et al. (2018), and Nogué et al. (2016a))

| Item | Justification | Coding |
|---|---|---|
| **0. Explicit use of the world "Landscape" (Paisagem, in Portuguese)** | | |
| **01. When was the Plan developed or approved?*** | Knowing the exact timeframe of the Plan's approval is critical for understanding the context in which the Plan was created. By identifying when the Plan was developed or approved, we can evaluate whether it aligns with contemporary landscape discussions, especially following the adoption of the Council of Europe Landscape Convention, or if it adheres to paradigms that were current at the time of its development. | Year |
| **02. How often does the Plan contain the word landscape (paisag*)?**** | By quantifying the occurrence of the word' landscape,' we can estimate the Plan's commitment to addressing landscape concerns. The frequency of the term can reflect the importance of landscape in the development of the Plan. | exact count |
| **1. How has the conceptualisation of landscape ("paisagem") in Portuguese coastal planning institutions evolved since 1978?** | | |
| **03. Does the Plan define the concept of landscape?** | This question serves as a foundational inquiry to determine the Plan's approach to and understanding of the landscape. | a) Yes<br>b) No, move to question 5 |
| **04. Which conceptualisation of landscape is used?** | This question aims to understand the perspective of the landscape adopted in the Plan, which is crucial as it determines the inclusiveness of considerations within the decision-making process. A holistic perspective, which integrates biophysical, socio-cultural, and aesthetic aspects of landscape, promotes comprehensive and balanced planning. In contrast, focusing solely on one perspective—whether biophysical, socio-cultural, or aesthetic—may limit the Plan's ability to address the diverse needs and values associated with landscapes. | a) Biophysical<br>b) Socio-cultural<br>c) Aesthetic<br>d) Holistic |
| **05. If the Plan does not define 'landscape,' is it possible to identify the conceptualisation that is used in its development?** | This question aims to explore if, even in the absence of an explicit definition of the landscape, it is feasible through contextual analysis of its content to determine its conceptualisation. | a) Biophysical<br>b) Socio-cultural<br>c) Aesthetic<br>d) Holistic<br>e) Not possible |
| **06. Does the Plan identify the boundaries of the coastal landscape?** | This question aims to understand whether the Plan adopts political-administrative boundaries or takes advantage of the integrative power of the conceptualisation of landscape. | a) Yes, the Plan identifies its boundaries from a landscape perspective<br>b) No, the Plan uses existing political-administrative boundaries or buffer zones |
| **07. Does the Plan identify coastal landscape types and/or coastal landscape character areas in its intervention area?** | The identification of landscape types and/or coastal landscape character areas is typically aligned with a scientific perspective of the concept of landscape. This question aims to determine if the identification of these elements aligns with the perspective used in the Plan's development (Simensen et al., 2018). | a) Yes<br>b) No |
| **08. Does the Plan consider all areas within the defined coastal landscape boundary as relevant, or does it focus only on specific parts, such as outstanding natural or cultural features?** | This question seeks to determine whether the scope of the plan considers all landscapes within the defined boundary as relevant, or if it prioritises certain parts of the landscape, such as outstanding natural or cultural features. | a) Yes, the Plan considers all the landscapes within the plan's boundary relevant<br>b) No, the Plan explicitly focuses only on part of the landscape<br>c) No, the Plan does not mention it |

| Item | Justification | Coding |
|---|---|---|
| **09. Does the Plan involve multiple actors in its development?** | The European Landscape Convention (ELC) emphasises the importance of multiple stakeholders in the definition and implementation of landscape policies. Different stakeholders have different values, and thus, multiple stakeholder engagement can frame and express goals for landscape development in different ways, stimulate complementarity in conservation activities and increase the sense of belonging | a) Yes, multiple actors are involved, discussing a landscape vision<br><br>b) Yes, multiple actors are involved, but without a focus on the landscape<br><br>c) Only mandatory state actors are involved<br><br>d) Not addressed at all |
| **10. Does the Plan establish a widely accessible participatory landscape-monitoring information system?** | To facilitate shared learning and adaptive planning, landscape-monitoring information needs to be widely accessible. Information collected in participative processes ideally supplements the data collected by government entities. | a) Yes, the Plan establishes a participatory landscape-monitoring information system that is widely accessible to actors and to the local community<br><br>b) Yes, but the accessibility of the participatory landscape-monitoring information system is limited to certain actors<br><br>c) No, the Plan does not establish a participatory landscape-monitoring information system<br><br>d) No, the Plan does not establish a landscape-monitoring information system at all |
| **11. Does the Plan effectively involve the participation of local communities?** | Landscape inhabitants need the ability to participate effectively in the planning and management of their region, which necessitates developing skills and organising events that facilitate participation at the landscape scale | a) Yes, local communities are actively engaged throughout the planning process<br><br>b) Yes, local communities have been consulted at key stages of the planning process<br><br>c) No, local community participation is minimal or not effectively integrated<br><br>d) Not addressed in the Plan |



| Item | Justification | Coding |
|---|---|---|
| **12. Does the Plan incorporate adaptive management practices that facilitate learning from outcomes and adjusting based on changes in the coastal landscape?** | Landscape processes are dynamic, and adaptive management is a means of adapting to these changing conditions. Adaptive management enables people to learn from the outcomes of management strategies and thus improve future planning. | a) Yes, the Plan includes adaptive management practices that allow for ongoing learning and adjustments based on changes in the coastal landscape<br><br>b) Partially, the Plan includes some elements of adaptive management, but it lacks comprehensive mechanisms for learning from outcomes and adjusting based on coastal landscape changes<br><br>c) No, the Plan does not incorporate adaptive management practices for learning from outcomes or making adjustments based on coastal landscape changes |
| **2. How has the integration of landscape ("paisagem") in Portuguese coastal planning institutions evolved since 1978?** | | |
| **2.1. Integration Based on Knowledge of Landscape Functioning** | | |
| **13. Does the Plan promote landscape multifunctionality?** | Multifunctionality is a complex concept which refers to the fact that one particular area can serve several purposes or that an area can be comprised of several smaller areas dedicated to specific uses. Multifunctionality is most clearly expressed through the multiple ecosystem services provided by the landscape, in complex land-use forms and in land-use rights. In general, multifunctionality is often considered as positive. Maintaining or developing multifunctional landscapes can thus be seen as one of many strategies towards sustainable development at the landscape level. | a) Yes, the Plan actively promotes landscape multifunctionality as a strategy for its development<br><br>b) Yes, but the promotion of landscape multifunctionality is limited to certain areas of the Plan<br><br>c) No, not addressed at all |

| Item | Justification | Coding |
|---|---|---|
| **14. Does the Plan consider multiple scales for its development?** | Landscape systems are hierarchically structured and scale-dependent. The scales to consider are the spatial scale (the extent or area covered), the temporal scale (i.e. years, decades or centuries) and the institutional scale (i.e. municipalities and regions). Landscape systems are best characterised on multiple scales and can be analysed through a hierarchy of nested scales. | a) Yes, the Plan considers multiple scales (spatial, temporal, and institutional) in its development<br><br>b) Yes, but the consideration of multiple scales is limited to certain aspects of the Plan<br><br>c) No, not addressed at all |
| **15. Does the Plan adopt a systems-level resilience?** | Resilience refers to a system's "capacity for renewal in a dynamic environment" and can be applied to landscape systems. In the context of landscapes, the term resilience is usually used positively. However, the resilient response of landscapes is not always desirable. | a) Yes, the Plan adopts a systems-level approach<br><br>b) Yes, with specific references regarding problems, goals, tasks<br><br>c) No, not addressed at all |
| **16. Does the Plan incorporate an understanding of temporal dynamics, addressing how landscapes change and evolve?** | Landscapes change continuously, and temporal dynamics are therefore an essential property of landscapes: changes make landscapes. This is also recognised in the formal definition of landscape in the European Landscape Convention. Spatial planning aims to guide the temporal dynamics of landscapes and the resulting spatial patterns in land use. | a) Yes, the Plan recognises the evolution and dynamism of landscapes, incorporating adaptive management strategies<br><br>b) Yes, but the recognition of landscape evolution and dynamism is limited to certain aspects of the Plan<br><br>c) No, the Plan does not explicitly recognise the evolution and dynamism of landscapes in its planning or management options |
| **17. Does the Plan promote landscape connectivity?** | Connectivity is a concept in the scientific fields of landscape ecology and conservation biology, which defines the degree to which the landscape facilitates or impedes the movement of species between habitat patches. Fragmentation refers to hampering processes in the landscape, as a result of subdividing spatial units, which may become too small to function properly. | a) Yes, the Plan actively promotes landscape connectivity for the entire Plan<br><br>b)Yes, but the promotion of landscape connectivity is limited to certain aspects of the Plan<br><br>c) No, not addressed at all |



| Item | Justification | Coding |
|---|---|---|
| **18. Does the Plan integrate the landscape structure in its development?** | The spatial configuration and composition of land-use are central aspects in the scientific field of landscape ecology. The spatial structure of the landscape interacts continuously with the ecological processes that shape it (Antrop & Van Eetvelde, 2017). | A) Yes, the Plan addresses the spatial relationship between patches, corridors and the matrix<br><br>b) Yes, with specific references regarding problems, goals, tasks<br><br>c) No, not addressed at all |
| **19. Does the Plan identify the driving forces of landscape change?** | This question is included to determine whether the Plan acknowledges and addresses the underlying factors influencing changes in the landscape. By assessing how comprehensively these driving forces are considered, the question aims to evaluate the Plan's ability to address root causes and develop strategies that mitigate negative impacts or harness positive influences on the landscape (Bürgi et al., 2022). | a) Yes, the Plan identifies and addresses direct and indirect driving forces influencing landscape change<br><br>b) Yes, the Plan partially addresses some driving forces of landscape change<br><br>c) No, the Plan does not address the driving forces of landscape change |
| **20. Does the Plan identify landscape values?** | This question aims to the diversity of landscape values that are recognised in the Plan. Evaluating how a plan identifies and addresses different landscape values ensures a comprehensive approach to landscape assessment (Nogué et al., 2016a). | a) Yes, the Plan addresses several landscape values<br><br>b) Yes, partially addresses landscape values<br><br>h) Not addressed at all |
| **2.2. Integration demonstrating the contribution of landscapes to Human Well-being** | | |
| **21. Does the Plan promote landscape-based recreation?** | Recreation is one of the key services or values of landscapes in many European regions. Typical landscape related recreational activities are walking, hiking, cycling, picnicking, skiing and water sports | a) Yes, the Plan actively promotes landscape-based recreation for the entire Plan<br><br>b) Yes, but the promotion of landscape-based recreation is limited to certain activities or areas<br><br>c) No, not addressed at all |

| Item | Justification | Coding |
|---|---|---|
| **22. Does the Plan promote the protection and/ or enhancement of landscape-related cultural heritage?** | Landscapes are important objects of our society's cultural heritage. They are part of our common heritage and integrate a variety of values, both natural and cultural. | a) Yes, the Plan actively promotes the protection and/or enhancement of landscape-related cultural heritage<br><br>b) Yes, but the promotion of landscape-related cultural heritage is limited to certain aspects<br><br>c) No, not addressed at all |
| **23. Does the Plan promote landscape stewardship practices?** | Landscape stewardship refers to the care and maintenance of a landscape. People develop a stewardship role for landscapes, and thus, landscapes contribute to the formation of local cultures whilst providing ecosystem services. Community-based and collaborative landscape initiatives are a manifestation of this stewardship. These initiatives can be diverse; however, their common aim is to maintain the value of landscapes. They can comprise of projects, platforms, initiatives or a set of activities which foster a broad range of landscape values. | a) Nature conservation (existing, promoted)<br><br>b) Cultural heritage (existing, promoted)<br><br>c) Landscape beauty (existing, promoted)<br><br>d) Sense of place, place identity Social well-being (existing, promoted)<br><br>e) Rural livelihood (existing, promoted)<br><br>f) Regulating services (existing, promoted)<br><br>g) Promotion of tourism (existing, promoted)<br><br>h) Organic food production, urban agriculture or communitygardens (existing, promoted)<br><br>i) No reference |



| Item | Justification | Coding |
|---|---|---|
| **2.3. Integration of Landscape in all main sections of plans** | | |
| **24. In which plan section of the landscape included?** | Main sections of a plan are: Introduction, goals, measures. This assessment indicates if the plans regards landscape within the urban region as a background for other activities (introduction), or as a pillar for the development of the urban region (visions and goals), something that should be actively be managed (measures and policy recommendations) and monitored. | a) Introduction<br><br>b) Inventory and analysis of biophysical and socio-economic processes<br><br>c) Visions and goals, Key Strategic domains<br><br>d) Regulatory norms, measures or policy recommendations<br><br>e) Funding schemes<br><br>f) Monitoring and evaluation |

## 8.3 Results

Applying the framework described in Table 13, this section evaluates the evolving conceptualisation and integration of landscape in Portuguese coastal planning institutions from 1978 until 2021. We organise this section as follows. First, we summarise the main results from the application of the content analysis framework in Table 14. Next, we delve into the detailed findings, structured around the two core research questions: how has the conceptualisation of landscape evolved over time. and second, how has its integration into coastal planning institutions changed. These findings are further elaborated in the following subsections.

Our analysis reveals two key findings. First, although references to the landscape have increased over time, there has been a decline in leveraging its integrative power within coastal planning institutions. Second, this decline is accompanied by a growing tendency to associate landscape valuation with Nature Protected Areas - an association we would have expected to be stronger in the past rather than in the present. Early conservation efforts predominantly focused on preserving the natural landscape, with landscape protection primarily concerned with outstanding coastal landscapes within the legal framework of protected areas. This association was particularly strong historically, as seen in the establishment of protected areas like the Areas of Outstanding Natural Beauty in Britain (1956), the Naturpark in Germany (1957), and the Parcs Naturels Régionaux in France (1967) (Antrop, 2013). Third, differing conceptualisations of the landscape emerged, with the unexpected finding that a holistic conceptualisation did not always correspond to high levels of integration. Instead, landscape integration primarily focused on aspects such as multifunctionality, connectivity, and fragmentation.



**Table 14** Synthesis of Principal Results from the Application of the Content Analysis Framework

| **Colour Legend** | Addressed | Partially addressed | Not addressed |
|---|---|---|---|
| | **COASTAL PLANNING INSTITUTIONS** | | |
| **FRAMEWORK ITEM** | **LRCZCC 77/78** | **POOC-CE 1999** | **POC-CE 2021** |
| **0. Explicit use of the world "Landscape"** | | | |
| 01. When was the Plan developed or approved?* | 1978<br>(the Study was never concluded nor implemented). | 1999 | 2021 |
| 02. How often does the Plan contain the word landscape (paisag*)?** | 46 | 53 | 384 |
| **1. How has the conceptualisation of landscape ("paisagem") in Portuguese coastal planning institutions evolved since 1978?** | | | |
| 03. Does the Plan define the concept of landscape? | No, move to question 5. | No, move to question 5. | Yes. |
| 04. Which conceptualisation of landscape is used? | n.a. | n.a. | Holistic. |
| 05. If the Plan does not define 'landscape,' is it possible to identify the conceptualisation that is used in its development? | Yes.<br>Holistic conceptualisation. | Yes.<br>Focus on biophysical and socio-cultural variables. | n.a. |
| 06. Does the Plan identify the boundaries of the coastal landscape? | No, but the author describes its limits. | No. | No. |
| 07. Does the Plan identify coastal landscape types and/or coastal landscape character areas in its intervention area? | No, but it is possible to deduce them based on the Study information. | Yes. | Yes. |

| | COASTAL PLANNING INSTITUTIONS | | |
|---|---|---|---|
| **FRAMEWORK ITEM** | **LRCZCC 77/78** | **POOC-CE 1999** | **POC-CE 2021** |
| **08. Does the Plan consider all areas within the defined coastal landscape boundary as relevant, or does it focus only on specific parts, such as outstanding natural or cultural features?** | Yes, the Plan considers all the coastal landscapes relevant. | No, the Plan explicitly considers only part of the coastal landscape relevant. | No, the Plan explicitly considers only part of the coastal landscape relevant. |
| **09. Does the Plan involve multiple actors in its development?** | Not addressed at all.[it was not expected to do so in 1978] | Only mandatory state actors are involved. | Yes, multiple actors are involved, but without a focus on the landscape. |
| **10. Does the Plan establish a widely accessible participatory landscape-monitoring information system?** | No, the Plan does not establish a landscape-monitoring information system at all<br><br>[it was not expected to do so in 1978]. | No, the Plan does not establish a landscape-monitoring information system at all. | No, the Plan does not establish a landscape-monitoring information system at all. |
| **11. Does the Plan effectively involve the participation of local communities?** | Not addressed in the Plan [it was not expected to do so in 1978]. | Not addressed in the Plan. | No, local community participation is minimal or not effectively integrated. |
| **12. Does the Plan incorporate adaptive management practices that facilitate learning from outcomes and adjusting based on changes in the coastal landscape?** | Not addressed in the Plan [it was not expected to do so in 1978]. | No, the Plan does not incorporate adaptive management practices for learning from outcomes or making adjustments based on coastal landscape changes. | Partially, the Plan includes some elements of adaptive management, but it lacks comprehensive mechanisms for learning from outcomes and adjusting based on coastal landscape changes. |



| | COASTAL PLANNING INSTITUTIONS | | |
|---|---|---|---|
| **FRAMEWORK ITEM** | **LRCZCC 77/78** | **POOC-CE 1999** | **POC-CE 2021** |
| **2. How has the integration of landscape ("paisagem") in Portuguese coastal planning institutions evolved since 1978?** | | | |
| **2.1. Integration Based on Knowledge of Landscape Functioning** | | | |
| **13. Does the Plan promote landscape multifunctionality?** | Yes, but the promotion of landscape multifunctionality is limited to certain areas of the Plan. | Yes, but the promotion of landscape multifunctionality is limited to certain areas of the Plan. | Yes, but the promotion of landscape multifunctionality is limited to certain areas of the Plan.<br><br>Also, there is a strong emphasis on the concept of ecosystem services as a goal to be achieved. |
| **14. Does the Plan consider multiple scales for its development?** | No, not addressed at all. | Yes, but the consideration of multiple scales is limited to certain aspects of the Plan. It only addressed institutional scales, from the local level to the regional level. | Yes, but the consideration of multiple scales is limited to certain aspects of the Plan. It only addressed institutional scales across several levels: national, regional and local. |
| **15. Does the Plan adopt a systems-level resilience?** | No, not addressed at all | No, not addressed at all | No, not addressed at all |
| **16. Does the Plan incorporate an understanding of temporal dynamics, addressing how landscapes change and evolve?** | Yes, but the recognition of landscape evolution and dynamism is limited to certain aspects of the Plan. | No, it only explores the year of the development of the studies. | Yes, but the recognition of landscape evolution and dynamism is limited to certain aspects of the Plan. |

| FRAMEWORK ITEM | COASTAL PLANNING INSTITUTIONS | | |
|---|---|---|---|
| | LRCZCC 77/78 | POOC-CE 1999 | POC-CE 2021 |
| 17. Does the Plan promote landscape connectivity? | Yes, but it does not explicitly use the concept.<br><br>It defines the Special Ecological and Agricultural Areas) that can considered precursors of the National Ecological and National Agricultural Reserve.<br><br>The Study also wanted to protect the 3km buffer as a Natural Park. | Yes, the Baseline Studies wanted to establish a coastal green corridor along the intervention area. However, the proposal was not incorporated into the approved version of the Plan.<br><br>The Baseline Studies also highlighted several areas to be included in the Protected Areas System, which were also not included in the final Plan.<br><br>The Plan used the National Ecological and Agricultural Reserve to define its Coastal Protection Area, which was the most restrictive category.<br><br>It uses the waterlines to promote green corridors. | Yes, the Plan promotes landscape connectivity through waterlines, particularly in areas included in the National System of Classified Areas.<br><br>The Plan used the National Ecological and Agricultural Reserve to define its territorial model. However, only part of it was included in the most restrictive category: Terrestrial Protection Zone - Coastal Protection Strip. |
| 18. Does the Plan integrate the landscape structure in its development? | No, not addressed at all | Yes, but it is closely tied to the spatial configuration of land use. | Yes, but it is closely tied to the spatial configuration of land use. |
| 19. Does the Plan identify the driving forces of landscape change? | No, the Plan does not address the driving forces of landscape change | No, the Plan does not address the driving forces of landscape change | No, the Plan does not address the driving forces of landscape change |



| FRAMEWORK ITEM | COASTAL PLANNING INSTITUTIONS | | |
|---|---|---|---|
| | LRCZCC 77/78 | POOC-CE 1999 | POC-CE 2021 |
| 20. Does the Plan identify landscape values? | Yes, the Study addressed several landscape values (natural, aesthetics, historical, social use, productive, visual) as it was its main goal. | Yes, partially addresses landscape values with a strong focus on natural values. | Yes, partially addresses landscape values with a strong focus on natural and biodiversity values. |
| **2.2. Integration demonstrating the contribution of landscapes to Human Well-being** | | | |
| 21. Does the Plan promote landscape-based recreation? | Yes, but the promotion of landscape-based recreation is limited to certain activities or areas. | Yes, but the promotion of landscape-based recreation is limited to certain activities or areas. | Yes, but the promotion of landscape-based recreation is limited to certain activities or areas. |
| 22. Does the Plan promote the protection and/or enhancement of landscape-related cultural heritage? | Yes. | Yes, but mainly from a visual integration perspective. | Yes, but mainly from a visual integration perspective |
| 23. Does the Plan promote landscape stewardship practices? | No reference. | No reference. | No reference. |
| **2.3. Integration of Landscape in all main sections of plans** | | | |
| 24. In which plan section of the landscape included? | a) Introduction<br><br>b) Inventory and analysis of biophysical and socio-economic processes<br><br>c) Visions and goals, Key Strategic domains | a) Introduction<br><br>b) Inventory and analysis of biophysical and socio-economic processes<br><br>c) Visions and goals, Key Strategic domains | Generic address across all sections |

### 8.3.1 The evolution of landscape conceptualisation in coastal planning institutions since 1978

The content analysis revealed an increasing frequency of the word 'landscape' (paisag*) in the documents over time, a trend that aligns with the growing number of documents produced for each Plan since 1978 (see Appendix 5 for a list of the legal documents required for the Plan's approval). However, despite this increase, only the POC-CE 2021 explicitly defines the concept of landscape, describing it as *"an essential component of the human environment, expressing the diversity of our common cultural and natural heritage. It forms the basis of local identity, performs important public functions in ecological, environmental, social, and cultural fields, and contributes to human well-being and the strengthening of local identity"* (Resolution of the Council of Ministers n.º. 111/2021, 4.2.2.1 - Natural Heritage and Landscape).

Although the LRCZCC 77/78 and the POOC-CE 1999 did not provide clear definitions of landscape, our content analysis enabled us to deduce their conceptualisations. The LRCZCC 77/78, for example, primarily focused on the biophysical and socio-cultural aspects of the landscape, also with a strong emphasis on aesthetics. This emphasis on the biophysical and cultural elements was also evident in the Baseline Studies of the POOC-CE 1999, although the aesthetics dimension was less prominent. Even though there are similarities in the conceptualisation of landscape in both plans, the approved version of the POOC-CE 1999 places a stronger emphasis on nature conservation and the protection of the outstanding natural coastal landscape. Despite the holistic definition of landscape in the POC-CE 2021, the approved Plan also closely adheres to the conservation-centric approach advocated in the POOC-CE 1999, though with a stronger emphasis on prioritising biodiversity protection and enhancement. None of the documents acknowledge the perceptual and symbolic aspects of the landscape, indicating a predominantly positivist understanding of the concept. For instance, although the POC-CE 2021 mentions the need to establish Landscape Quality Objectives - a concept from the Council of Europe Landscape Convention (Council of Europe, 2000b, 2016) that involves public authorities articulating community aspirations regarding the landscape and its features - it delegates this responsibility to the Municipalities and their Municipal Director Plans, rather than defining them directly and guiding municipal strategies from a regional landscape based-vision as advocated in the literature (Nijhuis et al., 2020; Wu, 2013).



While the POC-CE 2021 mentions the concept of landscape, only the LRCZCC 77/78 explicitly addresses the importance of using landscape boundaries in the plan development. However, none of these documents incorporate the sea area within their definition of landscape. The POC-CE 2021 intervention area extends to the -30m bathymetric line, and the programme includes proposals for the sea, however they do not include the seascape analysis or explore the relationship with the terrestrial landscape.

The LRCZCC 77/78 describes the boundaries of the coastal landscape between Caminha and Cortegaça, though it does not present a graphical representation: *"It is not easy to define the precise contours of a geo-economic-social compartment in the landscape of northwest Portugal that can be designated as a "coastal strip." However, in some areas, particularly north of the mouth of the Cávado River, such compartmentalisation is quite clearly delineated. But south of that river and up to the Douro, the landscape broadens into a wide plain that runs into the chain of hills formed by the Valongo anticline, stretching about 40 km from the Laúndos hills to the southern end of the Serra de Pias"* (de Araújo, 1978). A map of the locations mentioned throughout the results sections is now presented to help visualise and support the argumentation discussed in this section (Figure 10).

The author clarifies that the LRCZCC 77/78 does not aim to develop a comprehensive landscape planning proposal, which would require defining precise coastal landscape boundaries. Instead, it focuses on studying and characterising the landscape values within a critical 1 km area affected by urban sprawl, using a 3 km buffer. This buffer was intended to apply more restrictive measures to protect the coastal landscape, prioritising urban development beyond this area. The LRCZCC 77/78 was divided into Five Volumes, each corresponding to a major river basin, which, in our view, could potentially represent distinct landscape units in its development. The POOC-CE 1999 and POC-CE 2021 also employed buffers as intervention areas, as these areas are defined by law. Similar to the LRCZCC 77/78, the POOC-CE 1999 initially used a 3 km buffer in its Baseline Studies. However, due to legal requirements, the approved Plan focuses on a 500-meter buffer, excluding port jurisdiction areas. Additionally, in the Baseline Studies, the Plan also defined five landscape units based on variables such as physiography, geology, land use, and notable sites for nature conservation. Unlike the LRCZCC 77/78, these landscape units do not align with the major river basin boundaries but rather reflect the juxtaposition of the various variables mentioned.

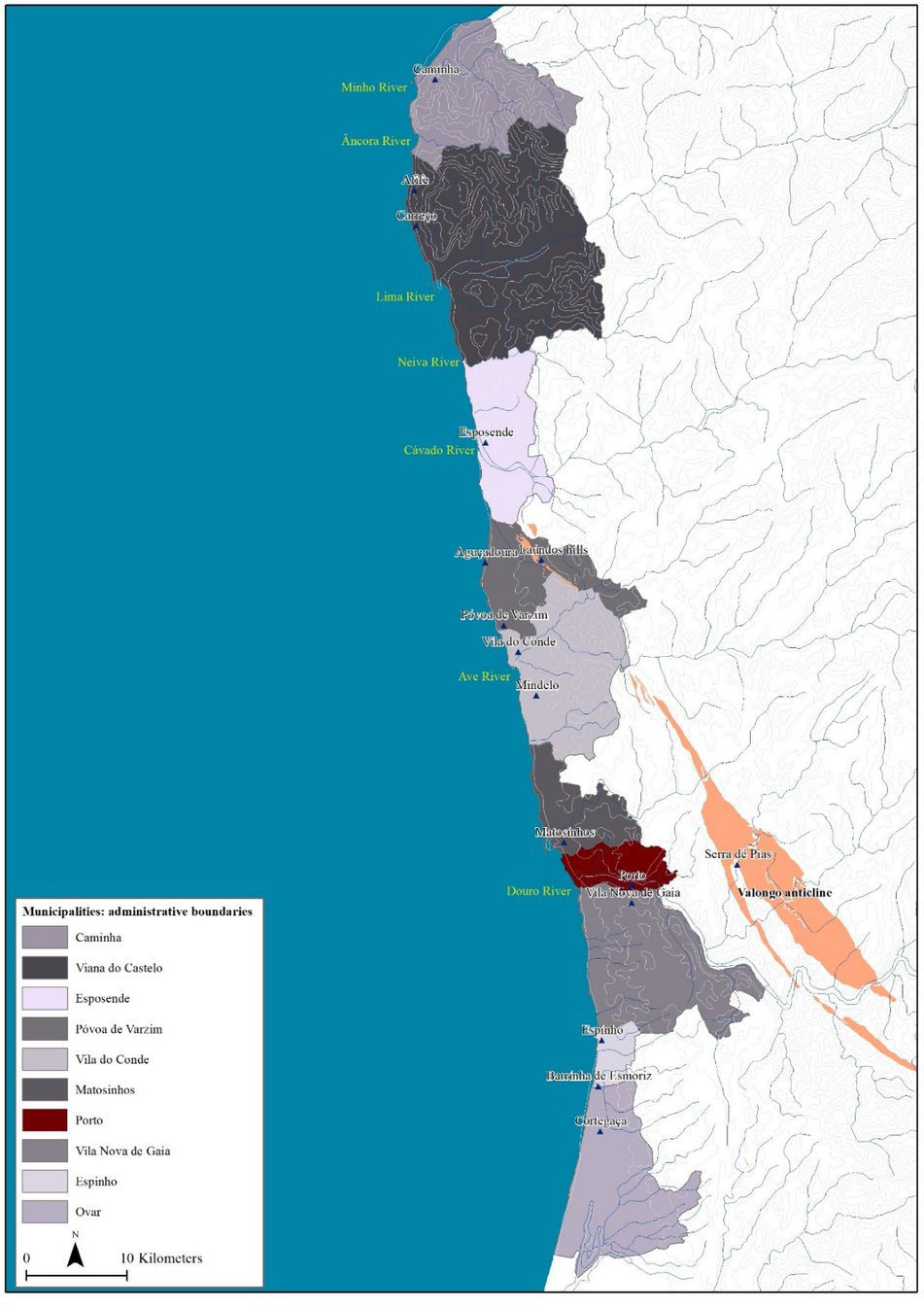


**Figure 10** Map of locations referenced in the results section

The POOC-CE 1999 describes the Plan as a regional plan, recognising the importance of not strictly adhering to municipal administrative boundaries. Its Baseline Studies suggest that these landscape units could facilitate the systematisation of intervention and management strategies for the coastal zone in conjunction with investment programs tailored to the different realities and pressures of the coastline. However, this novel idea was not incorporated in the approved version. Compared to the POOC-CE 1999, the POC-CE 2021 was legally required to incorporate port jurisdiction areas and had the legal option to extend its buffer from 500 meters to 1km. Despite this opportunity to protect a larger susceptible and dynamic coastal area, the Plan only extended the intervention area to include the estuaries of the Minho, Lima, Âncora, Neiva, Cávado, Ave, and Douro rivers without presenting specific criteria for this extension in the assessed documents. The POC-CE 21 notes the notable landscape diversity between Caminha and Espinho, encompassing two distinct landscape units: the Entre Douro e Minho and the Porto Metropolitan Area. However, it does not provide criteria for their identification and visual representation, nor does it indicate whether these units are based on any other study. Based on our knowledge, we cross-referenced this with the "*National Landscape Character Assessment*" for Continental Portugal developed by Cancela-d'Abreu et al. (2004) and confirmed that the POC-CE 2021 analysis was likely drawn on this Study. However, it is relevant to clarify that although the POC-CE 2021 refers to two landscape units, Cancela-d'Abreu et al. (2004) actually references two broader Regional Landscape Groups (Entre Douro e Minho and the Porto Metropolitan Area), each encompassing several landscape units. No detailed information regarding these Regional Landscape Groups or landscape units was provided or utilised in the POC-CE 2021 strategy and territorial model development.

Considering the Council of Europe Landscape Convention (Council of Europe, 2000b, 2016), which emphasises the importance of all landscapes and the involvement of diverse actors in formulating sectoral policies, one might expect a more significant involvement of citizens and stakeholders in the development of the POC-CE 2021, along with a strong focus on coastal landscape assessment and planning directives. However, while there were some improvements compared to the POOC-CE 1999 — where only State actors were involved—the involvement of local communities in 2021 remained minimal. Also, the Government still identified the most relevant actors and their participation was primarily limited to consultation rather than genuine participation. These assessment criteria do not apply to the LRCZCC 77/78,

as it was a study conducted at a time when public participation was beginning to emerge as a concern at the European and national levels (Kay & Alder, 2005; Pinho, 1985).

Similarly, the concept of 'adaptive management' was not addressed by the LRCZCC 77/78, despite the author's recognition of the intrinsic dynamism of landscapes, particularly coastal ones, due to the continuous interactions between land and sea. Adaptive management involves adapting to uncertainty and changing conditions in a flexible and ongoing manner (Holling, 1978; Kato & Ahern, 2008). While the POOC-CE 1999 acknowledged the dynamism of the coastal landscape, it did not incorporate adaptive management practices, either generally or from a landscape perspective. This reflect that, at the time, the concept of adaptive management was not yet widely adopted in coastal management, both in Portugal and globally, as the concept only gained significant traction after Rio 92, alongside the rise of Integrated Coastal Zone Management (Tompkins & Adger, 2004). The POC-CE 2021's vision for a *"resilient, developed, and sustainable coastal zone"* included an integrated and adaptive management model aimed at balancing coastal defence, protecting natural, cultural, and landscape heritage, and promoting economic enhancement of territorial resources. However, the actual implementation of adaptive management within the Plan was not effective, as demonstrated by Valente (2021). Also, along with the content analysis, it was evident that the adaptive management goal was mainly strongly linked to coastal risk management.

Despite the introduction of a monitoring system in POC-CE 2021, which was the first for such coastal plans, the focus was heavily on biodiversity and coastal risk monitoring. This system consisted of two types of indicators: (1) Performance Indicators, which were designed to track the implementation of the POC-CE 2021 Execution Programme and were directly tied to specific interventions and actions outlined in the Plan; (2) Outcome Indicators, which aimed to measure the extent to which the strategic objectives of the POC-CE 2021 were being met, as reflected in the Territorial Model and the Directives. A significant shortcoming of this monitoring system was the absence of outcome indicators specifically addressing the landscape. The performance indicators, though related to the landscape, were limited to specific interventions like "Interventions for the Enhancement of Coastal Landscapes". Examples of such interventions include the creation of nature trails, boardwalks, urban parks or the removal of invasive species. This narrow focus on landscape enhancement and recreational projects, rather than a broader and more integrated approach to landscape planning, indicates a limited operationalisation of the landscape concept. This operationalisation contrasts sharply with the more comprehensive concept of landscape outlined in the POC-CE 2021. The Plan's failure to develop a robust set of landscape-focused outcome indicators suggests that while the landscape was recognised as relevant, it was not fully integrated into the Plan's territorial model, directives and execution programme. Additionally, the monitoring system was not widely accessible to citizens participating in the monitoring process for any of the indicators.

### 8.3.2 The evolution of landscape integration in coastal planning institutions since 1978

#### *8.3.2.1 Integration based on knowledge of landscape functioning*

Regarding the integration of the landscape based on knowledge of landscape functioning, our findings show that multifunctionality, and landscape connectivity and fragmentation were the most commonly addressed factors. All three plans aimed to develop multifunctional landscapes that serve multiple purposes within the same area, although none explicitly used the concept of 'landscape multifunctionality'. While the planning and management of the coastal landscape with a view to hosting multiple functions is omnipresent, this multifunctionality is somewhat underdeveloped and could be strengthened with clearer methodologies. The POC-CE 2021, being the most recent Plan, places significant emphasis on promoting ecosystem services. However, neither multifunctionality nor ecosystem services are fully integrated into its territorial model or directives, as they are only referred to as a goal to be achieved through the Plan's implementation without clear guidance.

Regarding landscape connectivity and fragmentation, all plans address these concepts, though to varying degrees and with different approaches. As mentioned earlier, while the primary goal of the LRCZCC 77/78 was to characterise landscape values, the author introduced two chapters focusing on 'Landscape Protection' and 'Landscape Planning' in Volume 1 and 5, respectively. In these chapters, the author identified the main areas to be safeguarded and proposed measures to be implemented based on landscape knowledge, functions and values. Although the LRCZCC 77/78 did not explicitly use the concept of 'landscape connectivity and fragmentation', its proposal was built upon Decree-Law 613/76, which established a New

Nature Protection Regime and Creation of National Parks in Portugal (see Appendix 6). The LRCZCC 77/78 Landscape Protection/Landscape Planning proposal included two significant categories: Special Ecological Areas and Special Agricultural Areas. In the LRCZCC 77/78, the Special Ecological Areas included the protection of estuaries and their marshes, all the streams with more than 2 km of course, coastal lagoons, dunes, beaches, coastal rocks, and the coastal heath of *Cisto-Ulicetum humilis*. The Special Agricultural Areas included all the soils with the highest agricultural suitability. These categories would have played a crucial role in safeguarding the most ecologically sensitive and productive areas of the 3 km buffer used if the Study had been implemented. They can be considered precursors to the National Agricultural Reserve (Decree-Law 451/82) and National Ecological Reserve (Decree-Law 321/83), created in 1982 and 1983, respectively. The National Agricultural Reserve was established to protect *"the soils with the greatest aptitude for the production of agricultural goods indispensable for national supply, for the full development of agriculture and for the balance and stability of the landscape"* (Decree-Law 451/82). The National Ecological Reserve aimed to protect *"all areas essential to the ecological stability of the environment and the rational use of natural resources, with a view to proper land use planning"* (Decree-Law 321/83), namely the coastal ecosystems and the interior ecosystems (see Appendix 7 for more detail). In both reserves, urban development and construction were prohibited, and significant opposition was faced by the local Government (Schmidt et al., 2013). This opposition led to the regulation of the National Ecological Reserve not being fully established until 1990 (Decree-Law 193/90). This idea was also present in the LRCZCC 77/78, as the author considered that the Special Ecological Areas and Special Agricultural Areas would play a significant role in safeguarding the landscape structure and character against urban developments. Indeed, if they had been implemented in 1978, they could have been a game-changer in the evolution of the coastal landscape in the Northern Coastal Region.

Furthermore, it can be argued that by safeguarding the most ecologically sensitive and productive areas, these reserves help to ensure the continuity of ecological processes, habitat connectivity, and the movement of species across the landscape, while also protecting the best soils for agriculture. Also, today, the National Ecological and Agricultural Reserves are the backbone of most Green Infrastructure proposals in Portugal. Another relevant measure of the LRCZCC 77/78 was the definition of a 500-meter buffer where most of the urban areas should be contained. In this buffer, the Special Forest Areas should be protected or enhanced to create a barrier against sea winds and promote soil protection and regeneration. The Special Forest Areas within this buffer could also contribute to landscape connectivity, serving as a corridor that connects different natural areas, providing a continuous habitat and mitigating the fragmentation caused by urbanisation.

The Baseline Studies of the POOC-CE 1999 also emphasised the importance of protecting natural areas of high value and utilising the remaining areas as a green corridor, with the Public Maritime Domain serving as a structuring link element. The Public Maritime Domain refers to a public protection strip of 50 m along the coastline extending 30 m deep seaward. The Plan also highlighted that a proposal for the classification of the Northern coastline of Viana de Castelo, along with the Mindelo Ornithological Park, was underway. Additionally, it proposed extending the Protected Coastal Landscape of Esposende to include the mouth of the Lima River and Aguçadoura. The Barrinha de Esmoriz was also identified for potential protection at either the regional or national level. However, none of these proposals, including the green corridor, were incorporated into the approved version of the Plan.

It is essential to highlight that the LRCZCC 77/78 had earlier proposed classifying the entire coastal area between Caminha and Cortegaça as a Natural Park and designating the coastal strip from the Minho estuary to the Lima estuary as a Protected Landscape. These forward-thinking recommendations preceded the POOC-CE 1999 and demonstrated early recognition of comprehensive protection of the entire coastline, and not just the most outstanding coastal areas. The author considered that Protected Areas could be used as a tool for balancing economic development with recreation, nature conservation, and landscape protection. For instance, of all these proposals, only the Mindelo Ornithological Park received recognition as the Regional Protected Landscape of Vila do Conde Coastline and Mindelo Ornithological Reserve in 2009 despite the fact that since 1957, attempts have been made to protect this coastal area without success. Currently, the POC-CE 2021 continues to pursue the LRCZCC 77/78 and the POOC-CE 1999 vision by proposing the creation of a Protected Landscape along the Northern coastline of Viana de Castelo between Afife and Carreço but delegating the responsibility for its creation for the Municipality.

The National Ecological Reserve and the National Agricultural Reserve, which were already in force at the time the POOC-CE 1999 was developed, were automatically incorporated into the definition of the Coastal Protection

Area within the Plan (Appendix 8). This area corresponds to the most restrictive category, aimed at preserving notable or characteristic locations and landscapes of the natural and cultural heritage of the coastal zone, as well as the spaces necessary for maintaining ecological balance. Later, in the POC-CE 2021, with the legal mandatory transition from a Plan to a Program (see Appendix 2), the POC also considered the National Ecological Reserve and the National Agricultural Reserve for defining its territorial model. However, it did not explicitly delineate these areas in its territorial model (Appendix 9). This omission allows municipalities more flexibility to alter their boundaries, although such changes remain subject to control by the Northern Region Coordination and Development Commission. The POC-CE 21 focuses on enhancing the connectivity of coastal areas integrated into the National System of Classified Areas, and on promoting green corridors along the waterlines, an approach also emphasised by the POOC-CE 1999.

Regarding the use of multiple scales, neither institution fully utilised the integrative potential of landscape systems. Landscape systems are inherently hierarchical and scale-dependent, encompassing spatial, temporal, and institutional dimensions. None of the plans explored their intervention areas across different spatial scales, missing the opportunity to understand how various landscape elements interact across these scales. Specifically, the LRCZCC 77/78 did not consider multiple scales at all. The POOC-CE 1999 addressed institutional scales by incorporating the urban perimeters of Municipal Director Plans into its framework, but it would have been more effective to define these boundaries directly. This contrasts with the approach of the LRCZCC 77/78, which aimed to define criteria and identify areas for urban expansion from a regional perspective. This strategy would not only ensure the protection of the coastal landscape but also constrain municipalities' expectations for development on the dunes and other socio-ecological sensitive areas. In contrast, the POC-CE 2021, being the most recent Programme, effectively engaged with multiple institutional scales by aligning its strategy with higher-level plans in the current Portuguese planning system and establishing guidelines for the local level, as demanded by law.

In terms of temporal dynamics, the LRCZCC 77/78 only explored the humanisation of the landscape through its settlement evolution. The POOC-CE 1999 assessed the land use of the 3 km buffer but only for one year (1995), not exploring the landscape change dynamics. The POC-CE 2021 evaluated land use changes since 1999 and assessed the evolution of sections of the coastline based on available cartographic information. The option of focusing on land use change is one of the most used research methods to trace landscape change (Mohr et al., 2024), as it reduces the landscape complexity. However, it has limitations (Medeiros et al., 2021) as it does not fully embrace the contemporary conceptualisation of the landscape.

The assessment of driving forces, which include socio-economic, political, technological, natural, and cultural factors (Bürgi et al., 2022), is closely related to understanding landscape change. However, these driving forces were not explicitly addressed in any of the plans. All three plans focused on identifying the main problems or strengths of the area and occasionally related these to land-use changes but did not explicitly explore the underlying multiple internal or external dimensions driving those changes.

System-level resilience was the least frequently mentioned characteristic of landscape functioning, addressed only in the POC-CE 2021 but not from a landscape resilience perspective. *"Landscape resilience represents a spatially explicit approach that applies resilience theory to understand landscape dynamics in response to disturbances and their ecological and socio-economic consequences"* (Wu, 2021). In POC-CE 2021, the concept was often used as a buzzword, primarily linked to the need to enhance resilience against coastal erosion, overtopping, and coastal flooding, especially in the context of climate change. However, the Plan lacked specific directives on how to achieve this resilience and how to operationalise it within Municipal Director Plans.

The assessment of landscape structure was included in the Baseline Studies of the POOC-CE 1999 and POC-CE 2021, but it was also closely tied to the spatial configuration of land use. However, the configuration aspects – such as the size, shape, and spatial arrangement of individual patches – were not assessed. None of the plans explored landscape structure in quantitative terms, such as through statistical analysis or landscape metrics (Wu, 2004). Additionally, as previously mentioned, they did not attempt to understand landscape structure and functions from a multi-scale perspective, despite the fact that their analysis has also contributed to enhancing landscape connectivity. The LRCZCC 77/78 demonstrated a strong focus on evaluating biophysical and socio-economic variables to understand the different landscape suitabilities. This approach is closely related to the concept of landscape structure, as it involves assessing the spatial organisation and potential interactions between various landscape components. However, while the Plan addressed these variables, it did not explicitly frame them within the broader context of landscape structure as understood in landscape research, where considerations such as

spatial configuration, connectivity, and the interaction between ecological and cultural processes and landscape patterns are also crucial.

One of the strategic objectives of POC-CE 21 focuses on the "Protection and Conservation of Coastal Biophysical Systems and the Landscape". This objective encompasses various specific directives intended to be incorporated into the Municipal Director Plans (Appendix 10). However, while the Plan outlines several landscape-related norms, these guidelines are highly generic. The Plan asserts that landscape values, vistas, and landscape structural elements, along with the overall coastal landscape character, must be protected. However, it does not clarify what specific values or character are being referred to, nor does it provide guidance on how this protection should be achieved. Also, the Plan repeatedly refers to the conservation of environmental and landscape values, suggesting that it remains closely tied to the idea of the landscape as a remarkable element. Furthermore, the landscape is not reflected in the territorial model of the Plan. It only highlights the Areas of Special Interest for Nature Conservation, which includes areas within the Natura 2000 and the areas integrated into the Portuguese National System of Classified Areas, reinforcing its deviation from the Council of Europe Landscape Convention (Council of Europe, 2000b, 2016).

#### *8.3.2.2 Integration demonstrating the contribution of landscapes to Human well-being*

All three documents recognised the contribution of landscapes to human well-being, particularly emphasising the role of landscape-based recreation and tourism. Both the POOC-CE 1999 and the POC-CE 2021 placed greater emphasis on the coastline, while the LRCZCC 77/78 strategy, although it also recognised this relevance, aimed to promote 'Recreation Reserves' across the entire 3 km area.

The LRCZCC 77/78 supports the protection and enhancement of landscape-related cultural heritage, recognising that landscapes are crucial to our shared cultural heritage and encompass both natural and cultural values. It also highlights the relevance of viewpoints and panoramic roads as cultural landscape elements. In contrast, the POOC-CE 1999 and POC-CE 2021 focus on integrating architectural or cultural elements into their guidelines, which reduces the broader potential for protecting and enhancing landscape-related cultural heritage.



Landscape stewardship seeks to enhance multiple landscape values in a synergetic manner, involving inter-sectoral coordination and alignment of activities, policies, or investments. It is inherently self-organised and participatory, valuing diverse perspectives and ways of knowing to ensure that landscapes are managed sustainably for the benefit of both current and future generations (Bieling et al., 2020). While none of the documents addressed this concept, it would only have been expected in the most recent Plan, the POC-CE 2021, especially given that Portugal signed the Convention.

#### *8.3.2.3 Integration of landscape in all main sections of Plans*

Notwithstanding its age, the LRCZCC 77/78 was by far the most detailed and systematic in its approach to addressing the landscape, being the only Plan that specifically examined the coastal region from a landscape perspective. The POOC-CE 1999 added a chapter describing the main characteristics of the identified landscape units in the Baseline Studies. In contrast, the POC-CE 2021 merely referenced the term 'landscape' throughout its documents without providing concrete assessments or specific guidelines on how to integrate the concept into Municipal Director Plans or how to protect the values and the coastal landscape character mentioned.

## 8.4 Discussion

Our research aimed to explore the evolution of how landscape has been conceptualised and integrated within coastal planning institutions in the Northern Region of Portugal since 1978. The findings reveal a significant increase in references to the term "landscape" within coastal plans. However, this is coupled with a decreasing focus on the integrative potential of landscape science, contradicting the findings of Hersperger et al. (2020) on strategic spatial planning. While Hersperger et al. (2020) work emphasises the substantial role of landscape science as a key integrative tool in strategic spatial planning across various European contexts, our study shows that, in the case of Northern Portugal, landscape remains more of a rhetorical tool rather than being fully integrated into practical planning frameworks. This discrepancy suggests a need for further comparative research to explore the factors that contribute to this divergence in landscape integration. Additionally, this gap between the rhetorical emphasis on landscape and its practical application in coastal

planning institutions reflects broader challenges on coastal governance, where the landscape is mainly approached as a coastal scenery (Rangel-Buitrago & Ben-Haddad, 2024).

Despite Portugal ratifying the Council of Europe Landscape Convention (2000, 2016), our findings show that Northern coastal planning institutions do not fully align with its principles. This trend mirrors a pattern observed across other European regions where policies struggle to fully integrate landscape into their governance frameworks (De Montis, 2014, 2016; Olwig, 2007). A crucial element of the Convention is the conceptualisation of landscape, which ensures that all landscapes and their diverse values are comprehensively addressed, moving beyond earlier conservation policies focused solely on protecting and enhancing outstanding coastal landscapes (Antrop, 2013). This broader conceptualisation resonates with the multidisciplinary nature of landscape research, and the different methods available to characterise and assess landscape boundaries and values (Simensen et al., 2018).

However, while this multiplicity can help capture the complex socio-ecological dimensions of coastal landscapes, it can also presents challenges in fully operationalising this concept in governance systems. Insights from a relational and more-than-representational (Waterton, 2018) understanding of coastal landscapes offer promising directions for future coastal management, as advocated by Döring and Ratter (2021). A relational perspective emphasises the connections and interactions between people and landscapes, rather than treating them as separate or isolated. The more-than-representational approach extends beyond maps and scientific descriptions to include the emotional, social, and lived experiences of coastal landscapes (Lorimer, 2005). Together, these perspectives encourage a shift from a purely science-based approach to one that also considers the relational, emotive and perceptions of humans of their coast (Döring & Ratter, 2021). Also, as argued by several scholars (Cabana et al., 2023; Kelly et al., 2019; Schlüter et al., 2020c), coastal governance reforms are urgently needed, with one of the principal shortcomings being the failure to address the coast as a socio-ecological system, reinforcing the need for further research on how to operationalise this concept of multiple coasts within governance frameworks. In many coastal countries, as in Portugal, coastal planning instruments are geographical limited by buffers (de Andrés et al., 2023). Integrating the socio-ecological dynamics of landscapes into coastal governance could offer more resilient and adaptive management solutions for addressing the complex challenges faced by many coastal landscapes worldwide (de Andrés & Barragán-Muñoz, 2022; Gonçalves & Pinho, 2024b). However, the governance structure itself needs to be rethought to incorporate these boundaries and develop landscape planning instruments that can address multiple scales and temporal dynamics, system-level resilience, and adaptive management.

Another relevant finding is that the evolution of Portuguese coastal planning can be understood through key legislative milestones, strongly influenced by leading actors and dominant European discourses and policies (Table 15) (Gonçalves & Pinho, 2024a; Pinto & Partidário, 2012). The LRCZCC 77/78 introduced a holistic Landscape Model, promoting an integrated approach to planning from a landscape perspective. However, by the POOC-CE 1999, a shift in focus had occurred, with a narrower emphasis on the Nature Conservation Model, reflecting a trend toward reducing landscape integration in coastal planning strategies and strongly focusing on the outstanding landscape, or on areas that were already included in the Portuguese National System of Protected Areas. More recently, the POC-CE 2021 has prioritised a *Biodiversity Conservation Model*, aligning with the dominant approach in Portugal since 2000, which has been deeply influenced by European Commission directives, particularly following the introduction of the Natura 2000 network.

**Table 15** Relation of the documents assessed and the four models for the Portuguese landscape discourses (adapted from Gonçalves and Pinho (2024a))

| | | | | | |
|---|---|---|---|---|---|
| **National level** | **Period** | **1971-1974** | **1975–Early 1980s** | **Mid 1980s–Late 1990s** | **Early 2000s–present** |
| | **Model** | Wilderness model | Landscape model | Nature conservation model | Biodiversity conservation model |
| **Northern Region of Portugal** | **Plan** | Not applicable | LRCZCC 77/78 | POOC-CE 1999 | POC-CE 2021 |

A key takeaway from our study is the limited use of the landscape concept in today's Portugal's coastal planning institutions, namely in the POC-CE 2021, which fails to leverage the integrative potential of the landscape. The POC-CE 2021 aligns more with a restricted biodiversity conservation approach rather than embracing a holistic view, which contradicts the broader international trend toward landscape-based governance systems (Görg, 2007; Van Oosten et al., 2018b) and the advantages of landscape sustainability science (Wu, 2021). Despite the urgency of safeguarding and enhancing

biodiversity, an integrated landscape-based strategy (Kristensen & Primdahl, 2020) is fundamental for coastal regions, with a long-term landscape vision (Voskamp et al., 2023) that integrates local knowledge and values to ensure that coastal planning aligns with the unique characteristics and needs of each region. This way can contribute not only to biodiversity protection but also to sustainable development and enhanced community well-being (Gonçalves & Pinho, 2024b).

Additionally, more research is needed to explore the underlying reasons why coastal plans, despite recognising the value of the landscape both in itself and as a governance approach, fail to fully integrate it into their planning and management strategies as envisioned by earlier models. Understanding these gaps could shed light on the disarticulation between policy recognition and practical implementation, offering insights into how coastal landscape policy integration can be better achieved in future planning efforts. Further research should focus on comparing the national discourses of the main coastal actors (politicians, planners, and government officials) with those from other European coastal regions regarding their understanding of the landscape concept (de Koning, 2024). These perspectives and knowledge they bring can significantly influence the development of coastal landscape institutions. Such a study could reveal how institutional knowledge influences coastal landscape planning outcomes and provide valuable insights for improving coastal landscape governance frameworks. Furthermore, the role of local community perceptions of landscape (Quintas-Soriano et al., 2023), which remains underexplored in Portugal, also deserves greater attention. As demonstrated, current coastal institutions tend to focus predominantly on natural and physical values, overlooking the importance of how people experience, perceive and interact with the coastal landscape.

Moreover, our findings resonate with global literature on the importance of landscape connectivity and fragmentation in landscape planning (Antrop & Van Eetvelde, 2017; Forman, 1995). An essential aspect of our findings is the influence of landscape architecture theoretical knowledge on shaping key landscape instruments that remain relevant today, such as the National Ecological Reserve and the National Agricultural Reserve. These instruments serve as an essential landscape planning instrument (Pena et al., 2013) and form the basis for most greenways/green infrastructures (Ahern, 2002) in Portugal. As the debate increasingly emphasises nature-based solutions for coastal planning, these instruments may provide valuable insights for integrating ecological and landscape considerations into various planning frameworks across other geographies. Further research is needed to explore how these landscape instruments can be adapted to address contemporary environmental and planning challenges across different European contexts.

The findings also emphasise the hypothetical role that the LRCZCC 77/78 may have played in the evolution of the coastal landscape. Further research is needed to evaluate the potential impacts of Araújo's proposals on this evolution and to compare these effects with those of the POOC-CE 1999 and the POC-CE 2021.

This research highlights the broader relevance coastal landscape governance may play in reshaping the coastal governance debate. Lessons from the evolution of coastal planning in Northern Portugal demonstrate the necessity for further research to understand how the concept of landscape has evolved, how it has been integrated, and whether this evolution aligns with international discussions.

Finally, our findings emphasise the need for more policy guidelines on operationalising research into practice, as the evolution of coastal landscape governance in Portugal has shown a divergence from prominence to decline.

## 8.5 Concluding remarks

This research aimed to advance coastal landscape governance by examining how the concept of landscape has evolved and been integrated into coastal planning institutions in the Northern Coastal Region of Portugal from 1978 to the present. The empirical results reveal that, despite advancements in European landscape research driven by the Council of Europe Landscape Convention, coastal planning in Northern Portugal still falls short of fully leveraging the integrative potential of landscapes. Notably, we found that the study (LRCZCC 77/78) developed almost fifty years ago was more comprehensive and could have significantly transformed the coastal landscape if it had been completed and implemented. This insight highlights a missed opportunity and emphasises the need to revisit and reintegrate such visionary landscape approaches into current coastal governance.

Our research stresses the need for more evident integration across different knowledge systems in coastal planning. Coastal governance must foster collaboration among different knowledge systems, scientific, experiential,

and lay, and recognise that these various forms of knowledge contribute to the resilience, multifunctionality, and sustainability of coastal landscapes, as advocated by Gonçalves and Pinho (2024b). This integration of different forms of knowledge is crucial, considering that the concept of the landscape itself carries multiple meanings and varying methods for delineating its boundaries. Such complexity poses significant challenges to governance systems that are traditionally structured around sectoral and politically administrative planning instruments, which are often inadequate to address the integrative nature of landscapes.

Despite the limitations of generalising from a case study research, conceptual and policy shifts are inherently embedded in the specific contexts of individual places. A strength of our evolutionary study is that it highlights the urgent need for more empirical research in coastal landscape governance. From a broader perspective, such research could demonstrate the benefits of leveraging the integrative power of landscapes in coastal governance, potentially contributing to a paradigm shift towards coastal landscape governance.

Further research is needed to explore the landscape and planning imaginaries that underlie planning documents, particularly with regard to the nature/culture and land/sea dichotomies. This research could provide deeper insights into how these dichotomies have been shaping coastal governance and the conceptualisation and integration of landscape into planning. The chronological perspective employed in this study also presents a valuable framework for understanding the evolution of these imaginaries over time, which could inform future research on how shifts in landscape thinking impact planning practices. Future research should also explore how governance institutions can move beyond political-administrative boundaries to embrace landscape units, multi-scale systems, and adaptive governance. Specifically, it should focus on identifying the necessary instruments and actors for this transformation, which could facilitate more integrated and effective coastal landscape governance.

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**Contributions**

Conceptualisation — CG / Resources and data accuration – CG and JAG / Visualisations — CG / Writing — original draft preparation — CG / writing — review and editing — CG, and PP / supervision — PP / funding acquisition — CG and PP.



# 9 Between the Regional and Municipal scale

## Landscape science, coastal instruments, and landscape change: evolutionary insights from Portugal

**Abstract**

Since the mid-20th century, European landscapes, especially coastal regions, have faced significant transformations influenced by global and national trends, mainly driven by coastalisation. While studies have explored various aspects of coastal landscape changes across Europe and beyond, a fundamental gap remains: understanding how the conceptualisation and integration of landscape within coastal planning instruments impact broader landscape change evolution. This study addresses that gap through an evolutionary explanatory multiple case studies analysis of three municipalities in the Northern Region of Portugal, examining how the conceptualisation and integration of the landscape within three regional coastal planning instruments influenced coastal landscape changes from 1965 to 2018. Findings indicate that the degree of landscape integration varies among the coastal planning instruments, directly impacting the level of landscape protection. Our research suggests that higher levels of landscape integration could significantly enhance coastal landscape protection. An unexpected finding emerged regarding the conceptualisation of the landscape. While one might expect that a holistic conceptualisation would lead to high levels of integration,

this was not always the case. Results also highlight how underlying narratives, strongly influenced by the European Union, shaped the interpretation and practical management of coastal landscapes. Our research concludes with a call for further empirical research across diverse geographies to deepen understanding of coastal landscape governance. It also emphasises the need for political will to embrace risks and foster a radical, transformative shift to approach and conceptualise the governance system in line with the changing dynamics and socio-ecological values of coastal landscapes towards coastal landscape governance.

**Keywords:** Landscape sustainability science; Evolutionary governance theory; Integrated coastal zone management; Policy integration; Socio-ecological systems; Landscape approaches.

## 9.1. Introduction

Change is an inherent characteristic of landscapes (Forman & Godron, 1986), particularly in coastal regions, where dynamic interactions between land, sea, and human activities drive continuous transformations. However, human-driven changes often have numerous negative impacts, including biodiversity loss, ecosystem fragmentation, and the degradation of natural coastal resources. These changes weaken landscape sustainability (Wu, 2013, 2021) and diminish the ability of coastal landscapes to provide essential landscape services (Van der Sluis et al., 2019). Beyond ecological impacts, such transformations threaten the cultural, perceptual and aesthetic significance of coastal landscapes, reducing their role in supporting local identities, fostering human well-being, and preserving Europe's coastal natural and cultural heritage (Nogué & i Font, 2007).

Since the mid-20th century, European landscapes have experienced significant transformations driven by global and national trends. Processes such as urban expansion, agricultural intensification, land abandonment, forest expansion, international trade, new conservation demands, and renewable energy development have reshaped landscapes with varying impacts depending on the geographical, cultural, and socio-economic contexts (Plieninger et al., 2016). European coastal regions, in particular, have experienced profound changes due to coastalisation, which refers to the growing concentration of populations, economic activities, and urban development in coastal areas (Lagarias & Stratigea, 2023). With approximately 40% of the European Union's population living near the coast (European Environmental Agency, 2024), this trend has led to significant land use and land cover (LULC) changes. Natural landscapes have been increasingly replaced by artificial surfaces, altering the ecological and cultural identity of coastal regions (Hersperger et al., 2010), a phenomenon also observed globally (Williams et al., 2022).

In recent decades, landscape science has sought to understand the causes and consequences of landscape change, focusing on LULC transformations and their driving forces, which are the factors that influence transformations within and to a landscape (Bürgi et al., 2017b; Bürgi et al., 2005; Hersperger et al., 2010). Studies across diverse geographies have revealed varied patterns and impacts regarding coastal landscapes. For example, research has demonstrated the impact of agriculture, afforestation and urbanisation on the evolution of dunes in Central Italy (Malavasi et al., 2013); the degradation of coastal scenery due to extreme urbanisation and tourism in Chile (Rangel-Buitrago et al., 2018), or the impacts of policy changes on coastal landscape patterns in Zhejiang, China (Wang et al., 2024). Additionally, studies have investigated how stakeholders in coastal management understand the concept of landscape and its implications for decision-making, as seen in Cornwall, England (Köpsel & Walsh, 2018).

At the European level, the Council of Europe Landscape (Council of Europe, 2000, 2016) has emphasised the importance of landscapes for individual and societal well-being, defining landscape as *"an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors"*. This landmark international treaty was the first to address all aspects of landscapes, from ordinary to outstanding. However, despite its holistic approach, the integration of landscape in planning processes remains inconsistent across different Member-States (De Montis, 2014, 2016). The extent to which planning institutions conceptualise and integrate landscape into their planning options (Hersperger et al., 2020) directly influences landscape transformation. Nevertheless, this relationship remains insufficiently explored, particularly in the context of coastal landscapes, despite relevant examples (Döring et al., 2021; Egberts, 2019; Gonçalves & Pinho, 2024a). This lack of substantial evidence raises a crucial question: how does the conceptualisation and integration of landscape within coastal planning institutions influence long-term landscape change?

Institutions, in this context, encompass rules, such as regulations, norms, laws, policies, and plans, that coordinate interactions between actors (Beunen et al.,

2015). Institutions play a central role in the governance of the coastal landscape, as they are often governed through a complex network of laws, policies and plans (Berke et al., 2019). Empirical evidence is essential to demonstrate how different conceptualisations of landscape shape coastal planning options and, ultimately, long-term coastal landscape outcomes. Although the Council of Europe Landscape Convention (Council of Europe, 2000, 2016) provides a formal definition, the concept of landscape carries varied meanings depending on scientific and disciplinary backgrounds (Antrop & Van Eetvelde, 2017). Van Eetvelde et al. (2024) highlight that, despite progress in integrative and social-ecological conceptual models, research and practice remain dominated by binary distinctions, such as nature versus culture and physical versus social.

The contested nature of the conceptualisation of landscape extends beyond coastal governance and has been widely discussed in broader contexts (Antrop, 2013; Antrop & Van Eetvelde, 2017; Kühne, 2019), as well as in other specific contexts such as agricultural landscapes (Primdahl, 2018). Different interpretations, whether as an ecological system (Forman & Godron, 1986), a visual entity (Cosgrove, 1985; Cosgrove, 1984), a social construction (Kühne, 2019), or a socio-political space (Council of Europe, 2000, 2016; Jones et al., 2007), shape how landscapes are governed, managed, and transformed. For instance, policies framing landscape as an ecosystem tend to prioritise conservation and biodiversity, whereas aesthetic-driven approaches influence scenic preservation and tourism (Primdahl, 2018). Similarly, when the landscape is framed as a social construct, emphasis is placed on collective perceptions, historical narratives, and cultural identity, shaping policies that reflect social values and power dynamics (Kühne, 2019). A holistic approach, as advocated by the Council of Europe Landscape Convention (Council of Europe, 2000, 2016), aims for integrated planning that considers ecological, cultural, aesthetic, perceptual, and socio-economic dimensions. However, as Gonçalves and Pinho (2025) argue, this broader perspective is not always fully realised in practice. Their study of coastal plans in Northern Portugal found that, even when a plan promoted a holistic understanding of landscape as the one advocated by the Convention, its underlying model still aligned with a biodiversity-focused approach.

Just as agricultural landscapes have evolved from mono-functional, production-oriented spaces to more multifunctional landscapes incorporating conservation and recreation (Primdahl, 2018), coastal landscapes are experiencing similar shifts due to competing planning priorities. However, in coastal regions, the long-term effects of institutional frameworks on landscape change remain underexplored. Understanding how different conceptualisations of landscape influence its integration into coastal planning institutions is essential for ensuring governance frameworks support landscape sustainability rather than reinforcing sectoral or short-term interests.

The integration of landscape into coastal planning is increasingly recognised as essential to addressing the persistent shortcomings of coastal governance (Egberts, 2019; Walsh, 2020). Despite decades of efforts to promote integrated coastal management (Cicin-Sain & Knecht, 1993), governance remains fragmented, sectoral, and often disconnected from the socio-ecological realities of coastal landscapes (Van Assche et al., 2020). In many coastal countries, coastal planning and management struggles with competing sectoral interests, administrative fragmentation, and insufficient recognition of the land-sea continuum (Eger et al., 2021; Kelly et al., 2019). In response, there is a growing call for landscape-based governance to reframe coastal governance. Conceptualising coastal landscapes as dynamic socio-ecological systems, rather than mere physical spaces or natural, cultural or scenic assets, allows for a more holistic approach that incorporates ecological integrity, cultural heritage, and local community well-being (Dade et al., 2025; Gonçalves & Pinho, 2024a). By embedding landscape principles into coastal planning, primarily through a regional landscape-design approach (McHarg, 1969; Nijhuis et al., 2020), governance frameworks can move beyond static protection measures toward adaptive, participatory, and multifunctional strategies (Kristensen & Primdahl, 2020; Nogué & Wilbrand, 2018). This paradigm shift aligns with the Council of Europe Landscape Convention (Council of Europe, 2000, 2016), which calls for the recognition, protection, and sustainable planning and management of all landscapes, ensuring coastal governance embraces both environmental and societal needs. A landscape-governance approach offers the potential to bridge disciplinary silos, integrate spatial and policy planning, and enhance long-term coastal resilience (Beunen & Opdam, 2011; Kristensen & Primdahl, 2020). Furthermore, recognising coastal landscapes as public and common goods, the promotion of participatory governance can strengthen community involvement, fostering landscape justice and long-term sustainability (Egoz et al., 2018; Scott, 2011).

This research addresses the gap in understanding how the conceptualisation and integration of landscape within coastal management institutions influence long-term landscape change. We examine this relationship by analysing LULC transformations in three municipalities in Northern Portugal (Vila do Conde, Póvoa de Varzim, and Esposende). Portugal's extensive and diverse coastline,

coupled with its history of coastal and landscape planning, makes it an ideal case study. The country faces challenges such as coastal erosion, sea-level rise, environmental degradation, and urban and touristic development, all of which are influenced by its role as a European Union Member State and a signatory to the Council of Europe Landscape Convention (Council of Europe, 2000, 2016).

Building on Gonçalves and Pinho's (2025) evolutionary analysis of the conceptualisation and integration of landscape in coastal instruments in the Northern Region of Portugal (1978–2021), this study assesses whether and how these institutional changes have influenced long-term coastal landscape transformations. By linking their findings with an analysis of LULC evolution, we aim to provide empirical evidence on the real-world impacts of landscape conceptualisation and integration in coastal planning and management. The choice of municipalities and methodological details will be further explained in the Methods section.

While LULC analysis does not capture the full range of dimensions in the Convention's conceptualisation of landscape (Council of Europe, 2000, 2016), it provides a tangible measure of how planning and management decisions manifest in visible and measurable outcomes. Despite its narrower scope, LULC remains a valuable proxy for understanding landscape dynamics over long periods (Bürgi et al., 2017b; Medeiros et al., 2021), such as this 50-year research, particularly in contexts where other dimensions are difficult to quantify due to data limitations.

The article is organised into five sections. This introduction frames the research problem and provides a concise literature review to present the main objective of the study. Section 2 outlines the methodology, detailing the research process. Section 3 presents the results, followed by Section 4, which discusses the findings and their significance for coastal landscape governance and coastal governance. Finally, Section 5 summarises the conclusions and explores their implications for other geographical contexts.



## 9.2. Methods

Given the nature of the research question, our research design employs an explanatory multiple-case study. This methodology is well-suited for investigating complex, real-world phenomena, as it allows us to trace cause-effect relationships and explore how events unfold over time (Swaffield, 2017; Yin, 2009). We selected three case studies (Section 9.2.1.) to balance depth and breadth, enabling detailed exploration and robust comparative analysis. This approach facilitates cross-case comparisons to identify broader patterns and causal relationships while remaining manageable in scope and time. Although generalisation from case studies is limited, they provide in-depth insights into specific contexts, generating hypotheses that can inform future research and theory-building (Yin, 2009). The unit of analysis is the coastal management plans assessed by Gonçalves and Pinho (2025) (Table 16) and their effects on the coastal landscape through the assessment of LULC evolution. The time frame for our cartographic study spans between 1965 and 2018, based on the availability of cartographic data, as will be discussed in Section 9.2.3.

**Table 16** Coastal planning institutions developed from 1978 to the present, as assessed by Gonçalves and Pinho (2025)

| Issued | Time-horizon | Plan (abbreviation in Portuguese) | | Type of Policy Instrument | Area covered |
|---|---|---|---|---|---|
| 1977/78* | n.a. | Study: Landscape recognition of the coastal zone between Caminha and Cortegaça (1977–78), **not concluded and implemented** | LRCZCC 77/78 | Study / Strategic | Caminha-Cortegaça (3km buffer from the coastline) |
| 1999 | 10 years | Coastal Zone Management Plan Caminha-Espinho (Resolution of the Council of Ministers n.º 25/99) | POOC-CE 1999 | Plan / Regulation with binding rules | Caminha-Espinho (0,5km buffer from the coastline) |
| 2021 | 10 years | Coastal Zone Management Programme Caminha-Espinho (Resolution of the Council of Ministers n.º 111/2021) | POC-CE 2021 | Programme / Strategic | Caminha-Espinho (0,5km -1 km buffer from the coastline) |

The methodology consists of three main phases:

1. Analysing spatiotemporal LULC changes.

2. Assessing the conceptualisation and integration of landscape in the three coastal plans with spatial representation.

3. Conducting a coupling analysis of the planning proposals and the LULC changes.

Before detailing these phases, we first explain the criteria for selecting the three case studies (Section 9.2.1.) and for defining the boundaries of the coastal landscape (Section 9.2.2.).

### 9.2.1. Criteria for the selection of the case studies

Gonçalves and Pinho (2025) selected the Northern Region for their research due to the existence of a rare coastal landscape study conducted by landscape architect Ilídio de Araújo between 1977 and 1978, entitled *"Landscape Recognition of the Coastal Zone between Caminha and Cortegaça"* (LRCZCC 77/78). Although this study was never completed or implemented, it remains significant for its pioneering landscape perspective and regional scale, which are comparable to later coastal management plans.

In Northern Portugal, the municipalities of Vila do Conde, Póvoa de Varzim, and Esposende (Figure 1) were selected based on the following criteria. Vila do Conde, located approximately 30 km from Porto, was chosen as the first case study because of its historical significance as the site of Portugal's early conservation initiative in 1957, marked by the establishment of the Mindelo Ornithological Reserve (Pinto & Partidário, 2012; Velo-Antón, 2020). During this period, Portugal was influenced by European trends in nature and landscape conservation, which began in the 1950s with the creation of protected natural areas (Antrop, 2013; Gonçalves & Pinho, 2024a). This trend indicates that the concept of landscape and its integration into governance originated from efforts to safeguard exceptional coastal landscapes, primarily through the establishment of protected areas.

To enable comparative analysis, we established two additional criteria. First, spatial and landscape character continuity should exist between all cases. Secondly, at least one case should include a coastal protected area established in a different period. Based on these criteria, the other case studies selected are Póvoa de Varzim (case study 2), which lacks a protected area, and Esposende (case study 3), which has a Coastal Landscape Protected Area created in 1987. These cases do not represent 'best practice' examples of coastal landscape governance in Portuguese scientific literature. However, they provide an opportunity to trace, describe, and explain how the landscape concept has been integrated into the coastal institutions and how this integration has influenced LULC changes in the coastal landscape of the three municipalities. The location of the three case studies in relation to Portugal, the Northern region, and Porto can be observed in Figure 11.

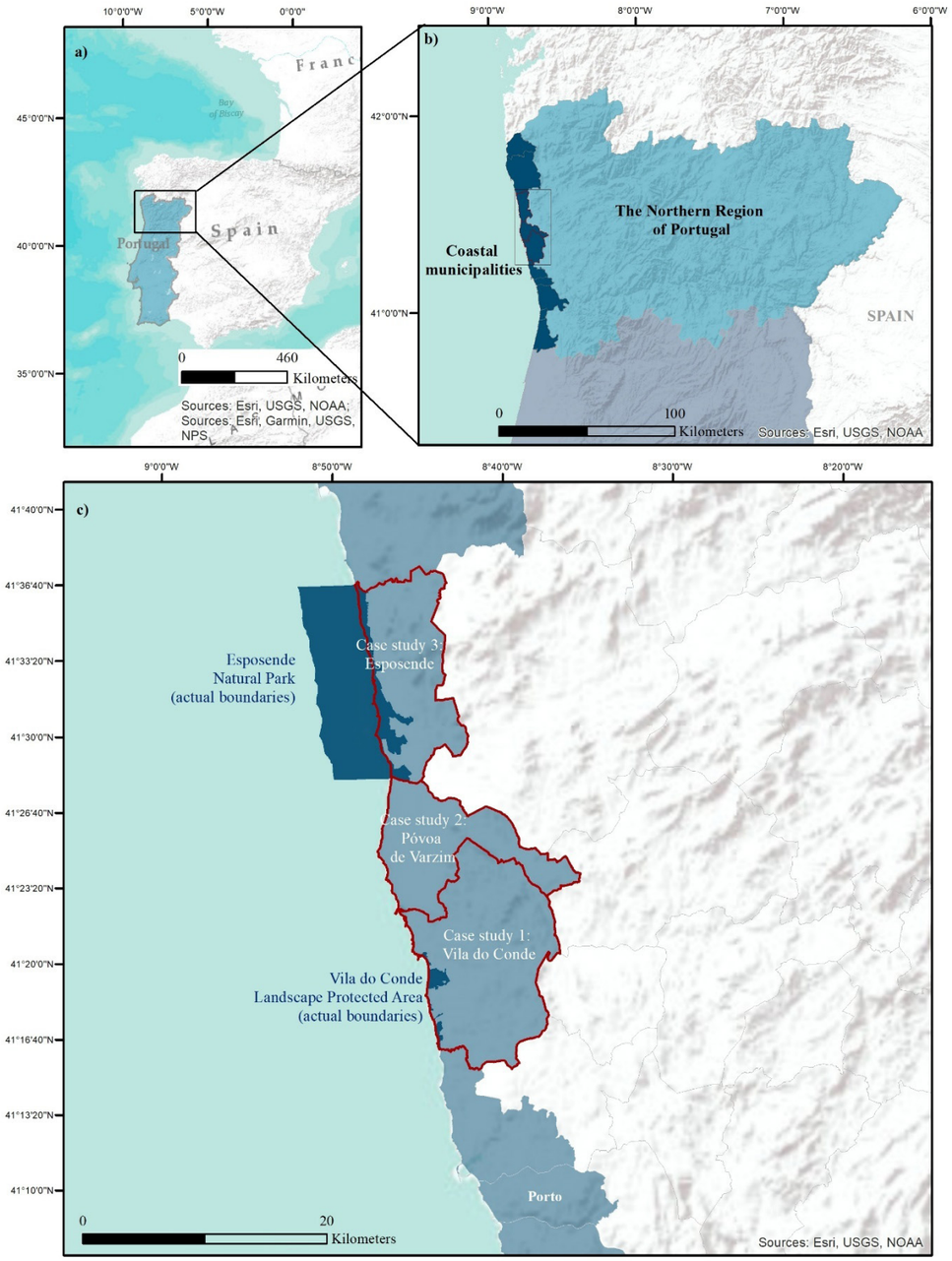



**Figure 11** Location of the case studies in (a) Portugal, (b) in the Northern Region of Portugal (c) and in relation to Porto



### 9.2.2. The identification of the boundaries of the system to be governed in the case studies

After selecting the three case studies, each corresponding to specific municipal boundaries, it was essential to identify the boundaries of the coastal landscape (the system being governed) before conducting the spatiotemporal analysis of the LULC changes. However, defining what constitutes a 'coastal landscape' in a specific context could be a research project in itself (de Andrés & Barragán-Muñoz, 2022; Simensen et al., 2018). Given the limited time and resources, we could not comprehensively define and delimit the coastal landscape in the broad sense advocated by the Council of Europe Landscape Convention (Council of Europe, 2000, 2016). Such an approach would require community engagement to understand local perceptions of the coastal landscape and consideration of the seascape perspective, both of which are complex and beyond the scope of this research.

Therefore, we decided to adopt the boundaries defined by the three plans assessed by Gonçalves and Pinho (2025), upon which our research is based. We acknowledge that this is a research limitation dictated by practical reasons, as buffer limits do not fully account for the coastal socio-ecological dynamics and functions. Table 17 presents the boundaries used by each policy instrument.

**Table 17** Definition of the system to be governed in the plans under analysis (adapted from Gonçalves and Pinho (2025))

| Year | Instrument | Definition of the system to be governed |
|---|---|---|
| 1977/78 | Study LRCZCC 77/78 | *"This work aims to inventory and characterise the existing cultural values of the landscape in a 1 km wide coastal strip for its protection. However, since the adoption of measures to defend this landscape will necessitate the transfer of activities that would tend to establish themselves there to the immediately contiguous inland strip, the recognition area was expanded to an average width of 3 km."* |
| 1999 | POOC-CE 1999. | 50 meters of the public maritime domain and a strip of 450 meters, excluding harbours jurisdiction areas, and 30 meters depth seaward. |
| | | The baseline studies assessed a 3 km buffer area defined from the coastline. |
| 2021 | POC-CE 2021 | 50 meters of the public maritime domain and a strip of 450 meters that may be extended to 1000m by the need to protect coastal biophysical systems located beyond the current 500m coastal strip, and 30 meters depth seaward. |
| | | The POC-CE only extended the intervention area to 1000 meters to include the estuaries of the Minho, Lima, Âncora, Neiva, Cávado, Ave, and Douro rivers. |

Considering that both the study LRCZCC 77/78 and the baseline studies of the POOC-CE 1999 used a broader 3 km buffer limit, we decided to adopt this measure on land for each case study (Figure 12). We also decided to exclude the complex interactions between land and sea, as well as coastal waters, from our analysis due to inconsistencies in the data available for our timeframe. This decision was made to ensure the accuracy of our findings, given the variability and lack of reliable information on these topics.

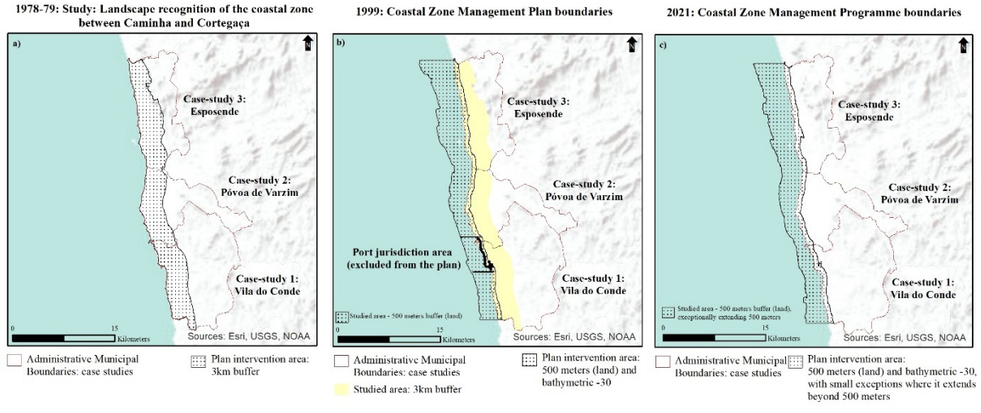



**Figure 12** Limits of the system to be governed used in a) the study LRCZCC 77/78; b) the POOC-CE1999, and c) the POC-CE 2021

### 9.2.3. Spatiotemporal analysis of the LULC changes

#### *9.2.3.1. Data Harmonisation and LULC Classification*

To analyse the spatiotemporal LULC changes, we used an open-access dataset in vector format (shapefile) produced by the General Directorate for the Territory for mainland Portugal. These datasets cover 1995, 2007, 2010, 2015, and 2018. We selected three timeframes:

1. 1995, preceding the approval of the POOC-CE 1999;

2. 2007, marking the period before the first scheduled review of the POOC-CE (legally due after ten years but delayed until 2021); and

3. 2018, the most recent dataset available, reflecting the LULC conditions leading up to the POC-CE 2021.

For the study LRCZCC 77/78, we obtained historical aerial images from a 1965 flight through an official agreement with The Northern Region Coordination and Development Commission and Directorate-General for the Territory. For a detailed description of the orthomosaic generation process, following Gonçalves (2016) methodology, as well as the map and classification of LULC for 1965, see Appendix 11.

However, it is important to note that no intermediate cartography was available between 1965 and 1995, which reduces the level of detail in the analysis. Additionally, while the other periods (1995-2007 and 2007-2018) cover similar periods, the 1965-1995 timeframe extends over 30 years, making comparisons less consistent and adding another limitation, as it is more challenging to track gradual transitions. However, despite this constraint, our aim with the analysis of this period is to identify significant transformations in LULC that could have been prevented if the LRCZCC 77/78 had been completed and implemented.

The LULC classification system in Portugal consists of four levels of detail. To ensure consistency across datasets, we followed the first-level mega classes and consolidated the remaining levels into 13 classes tailored to our case studies. We opted for the first level because, for the 1965 dataset, we faced limitations in distinguishing detailed agricultural categories from historical aerial photographs. While this approach ensures comparability across timeframes, it limits the ability to describe agricultural intensification and extensification in detail. Table 18 provides a short description of the aggregated classes used in this research.

**Table 18** Land use mega classes and classes used in this research with a short description of the main composition (adapted from Direção-Geral DGT (2022))

| Mega class (7) | | Class (13) | | Short Description |
|---|---|---|---|---|
| 1. Artificialised surfaces | ARTS | 1. Artificialised surfaces | ARTS | This class refers to land used for human activities, including built-up areas, industrial, commercial, and tourism zones, infrastructure (such as roads and railways), service areas, gardens, and other facilities. |
| 2. Agriculture | AGR | 2. Agriculture | AGR | Agricultural land, including: annual crops, permanent crops, pastures and heterogeneous agricultural areas. |
| | | 3. Greenhouses | PCG | (Plastic-covered) Greenhouses involve the cultivation of agricultural species and nurseries for both agricultural and ornamental plants. This form of agriculture typically utilises plastic structures and must be designed to allow human accessibility, ensuring that workers can move and work inside while standing upright. |

| Mega class (7) | | Class (13) | | Short Description |
|---|---|---|---|---|
| 3. Forest | FOR | 4. Forest of Eucalyptus | FOE | Forests where the dominant species is eucalyptus (Eucalyptus spp.). |
| | | 5. Forest of invasive species | FIS | Forests where the dominant species is a tree species legally classified as invasive. |
| | | 6. Forest of other conifers | FOC | Forests where dominance is observed in a species of other conifers. |
| | | 7. Forest of other hardwoods | FOH | Forests where the dominant species are other oak species, mostly the English oak (Quercus robur). |
| | | 8. Forest of Pinus pinea | FPP | Forests where the dominant species is the stone pine (Pinus pinea). |
| | | 9. Forest of Pinus pynaster | FPPY | Forests where the dominant species is the maritime pine (Pinus pinaster). |
| 4. Shrubland | SRH | 10. Shrubland | SRH | Natural areas of spontaneous vegetation, either sparse or dense, where the shrub cover is equal to or greater than 25%. |
| 5. Open spaces with little or no vegetation | OPE | 11. Beaches and dunes | BDU | Beaches and dunes in coastal areas, with vegetation cover less than 10% and no agricultural, forestry, or urban use. This category does not include dunes with shrub or tree vegetation. |
| 6. Wetlands | WET | 12. Wetlands | WET | Coastal areas covered temporarily or permanently by freshwater or saltwater, whether flowing or stagnant, including saltmarshes, and intertidal zones in estuarine areas. |
| 7. Water | WAT | 13. Water | WAT | Watercourses with a natural, artificial, or modified character that have a minimum width of 20 meters or more. |

#### *9.2.3.2. Analysing LULC Class Transitions and Types of Change*

Afterwards, following Malavasi et al. (2013), we analysed LULC Class Transitions to track changes over time and identify trends across the intervals available (1965-1995 / 1995-2007 / 2007-2018, and 1965-2018), which will later be compared with the results of the landscape conceptualisation and integration in the LRCZCC 77/78, POOC-CE 1999, and POC-CE 2021.

LULC class transitions were first classified into three main types: conversion, modification, and no change (Table 19). Subsequently, these transitions were further reclassified into specific types of change, including urbanisation, agricultural expansion, afforestation, and others, as presented in Table 20. Each category of the LULC class transition and the type of change is briefly described in the corresponding tables.



**Table 19** Classification of LULC class transitions

| Periods | Classes | Classes | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ARTS | AGR | PCG | FOE | FIS | FOC | FOH | FPP | FPPY | SRH | BDU | WET | WAT | OCE |
| 1965-2018 | ARTS | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | |
| | PCG | | | | | | | | | | | | | | |
| | FOE | | | | | | | | | | | | | | |
| | FIS | | | | | | | | | | | | | | |
| | FOC | | | | | | | | | | | | | | |
| | FOH | | | | | | | | | | | | | | |
| | FPP | | | | | | | | | | | | | | |
| | FPPY | | | | | | | | | | | | | | |
| | SRH | | | | | | | | | | | | | | |
| | BDU | | | | | | | | | | | | | | |
| | WET | | | | | | | | | | | | | | |
| | WAT | | | | | | | | | | | | | | |
| | OCE | | | | | | | | | | | | | | |

| Legend | | |
|---|---|---|
| Conversion | | A complete shift from one LULC class to another |
| Modification | | A change in the intensity or character of the existing LULC class, without entirely changing its primary mega-class. |
| No change | | The LULC remains the same over a given period. |

**Table 20** Types of change

| Classes | Classes | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ARTS | AGR | PCG | FOE | FIS | FOC | FOH | FPP | FPPY | SRH | BDU | WET | WAT |
| ARTS | | | | | | | | | | | | | |
| AGR | | | | | | | | | | | | | |
| PCG | | | | | | | | | | | | | |
| FOE | | | | | | | | | | | | | |
| FIS | | | | | | | | | | | | | |
| FOC | | | | | | | | | | | | | |
| FOH | | | | | | | | | | | | | |
| FPP | | | | | | | | | | | | | |
| FPPY | | | | | | | | | | | | | |
| SRH | | | | | | | | | | | | | |
| BDU | | | | | | | | | | | | | |
| WET | | | | | | | | | | | | | |
| WAT | | | | | | | | | | | | | |

| Legend | | Description |
|---|---|---|
| No change | | Areas where LULC remain consistent over the specified period |
| Urbanisation | | Conversion of land to urban uses, characterised by increased infrastructure and urban development |
| Regeneration | | natural recovery or restoration of ecosystems |

| | | |
|---|---|---|
| Agricultural expansion | | Increase in agricultural area, typically through the conversion of non-agricultural land |
| Agricultural expansion with deforestation | | Expansion of agricultural land accompanied by the clearing of forests |
| Agricultural transition | | Shift in agricultural practices or crop types within existing agricultural areas |
| Reforestation | | The process of planting trees in an area that has lost forest cover, or altering the species present |
| Afforestation | | Establishment of forests in areas that were previously non-forested |
| Establishment of invasive species | | It refers to the process by which non-native species successfully thrive and dominate over the native species |
| Deforestation | | Permanent removal of forest cover, leading to land use changes |
| Abandonment | | It refers to the process in which land are left unmaintained and unused, often resulting in natural reclamation by vegetation or changes in land use |
| Submergence | | It refers to the process by which land or vegetation is submerged under water due to rising water levels, flooding, or other hydrological changes |
| Water to land transition | | It describes the processes by which aquatic environments evolve into terrestrial ecosystems |
| Land to water transition | | It refers to the dynamic processes where terrestrial ecosystems transform into aquatic environments |

### 9.2.4. Landscape conceptualisation and integration in the LRCZCC 77/78, POOC-CE 1999, and POC-CE 2021

Next, we examined the findings of Gonçalves and Pinho (2025) to identify the most relevant aspects of the conceptualisation and integration of landscape in the LRCZCC 77/78, POOC-CE 1999, and POC-CE 2021 that have a cartographic translation. While their research provided a qualitative content analysis, it did not assess this specific aspect, making our analysis a novel contribution to their findings. The authors adapted the content analysis protocol from Hersperger et al. (2020), incorporating insights from Runhaar et al. (2024), Bürgi et al. (2022), Simensen et al. (2018), and Nogué et al. (2016). The proposed framework assessed the following points:

1. The explicit use of the term *Landscape* ("Paisagem" in Portuguese).

2. The evolution of the conceptualisation of landscape ("paisagem") in coastal management plans for the Northern Region of Portugal since 1978.

3. The evolution of the integration of landscape ("paisagem") in these plans since 1978.



To further elaborate on the third point, the authors assessed the integration of landscape through three dimensions, as outlined in Table 21. These dimensions include (1) integration based on knowledge of landscape functioning, which evaluates whether the plan considers multifunctionality, multiple scales, resilience, temporal dynamics, connectivity, structure, driving forces, and values of landscapes; (2) integration demonstrating the contribution of landscapes to human well-being, which examines whether the plan promotes landscape-based recreation, cultural heritage protection, and stewardship practices; and (3) integration of landscape in all main sections of plans, which identifies where and how the landscape is incorporated across the plan's structure. Table 21 provides a detailed breakdown of the specific items assessed under each dimension, offering a comprehensive framework for evaluating the extent of landscape integration in planning processes. For further information on the complete protocol, consult Gonçalves and Pinho (2025).

**Table 21** Items assessed by Gonçalves and Pinho (2025) regarding the integration of landscape

| Integration Based on Knowledge of Landscape Functioning | Integration demonstrating the contribution of landscapes to Human Well-being | Integration of Landscape in all main sections of plans |
|---|---|---|
| Does the Plan promote landscape multifunctionality? | Does the Plan promote landscape-based recreation? | In which plan section is landscape included? |
| Does the Plan consider multiple scales for its development? | Does the Plan promote the protection and/or enhancement of landscape-related cultural heritage? | |
| Does the Plan adopt a systems-level resilience? | Does the Plan promote landscape stewardship practices? | |
| Does the Plan incorporate an understanding of temporal dynamics, addressing how landscapes change and evolve? | | |
| Does the Plan promote landscape connectivity? | | |
| Does the Plan integrate the landscape structure in its development? | | |
| Does the Plan identify the driving forces of landscape change? | | |
| Does the Plan identify landscape values? | | |

Since the LRCZCC 77/78 texts and cartography were incomplete, we developed a systematic methodology to reconstruct its landscape vision and strategy for our case studies. Although Araújo (1978) initially described the project as a simple mapping of landscape values, the author ultimately produced a chapter and maps of landscape planning/protection (Figure 13) in two of the five volumes (Volume I – from Minho to Lima and Volume V – Douro to Cortegaça). These documents served as the basis for replicating his approach in the remaining volumes, allowing us to deduce his proposal for our three case studies. This process involved:

1. Identifying missing data across the five volumes of the study.

2. Analysing Volumes 1 and 5, which were more complete and contained landscape planning/protection maps (Figure 13).

3. Cross-referencing text and maps to extract relevant landscape classification proposals.

4. Comparing classification schemes used across different volumes to ensure consistency.

5. Standardising inferred categories by aligning them with Decree-Law 613/76 (Table 22), which influenced Araújo's (1978) classifications framework in the LRCZCC 77/78. Decree-Law 613/76 established Portugal's national nature protection framework at the time and strongly influenced the LRCZCC 77/78.

6. Developing a reconstructed landscape protection framework, estimating the categories Araújo (1978) would have applied to our three case studies (Table 23) and produced a deduced cartographic output with his vision (Figure 14).

The complete methodological steps for this analysis, including the completion process for missing data, are detailed in Appendix 12.

**Table 22** Description of the categories and subcategories of the Decree-Law 613/76

| **Decree-Law 613/76 - New nature protection regime and creation of national parks** | | |
|---|---|---|
| **Categories** | **Subcategories** | **Description** |
| **Integral nature reserves and national parks** | **Integral nature reserves** | Where protection concerns all aspects of nature, preventing any action that alters the dynamics of the respective ecosystems and where human presence is only permitted for administrative or scientific reasons. |
| | **National parks** | A set of reserves established for the protection of nature and the education of the population. The national park may contain integral and partial nature reserves surrounded by areas of protection and recreation. The presence of human establishments is only possible under particular conditions and as facilities. |
| **Partial nature reserve** | **Not applicable** | Where efforts are made to safeguard certain well-defined aspects of Nature, whether concerning its fauna, flora, soil, geology, or water resources, by taking appropriate measures that allow for their protection, scientific study, and use. Thus, biological, botanical, zoological (ornithological and others), geological, aquatic, and marine nature reserves can be established. |
| **Recreation reserve** | Not applicable | This corresponds to what has sometimes been referred to as a tourist reserve, as tourism is considered to be the commercialisation of recreation, which is the use of leisure time by workers from any sector.<br><br>In this classification, areas particularly suited to meeting the recreational needs of urban populations, whether active or passive, are considered. These areas emphasise recreational and scenic functions, among others, while still taking into account concerns for the protection of the natural environment and ecological balance. |
| **Protected landscape** | Not applicable | This corresponds to what has sometimes been referred to as a landscape reserve. The aim is to safeguard rural or urban areas where characteristic aspects of the culture and habits of the people still exist, as well as in constructions and the design of spaces. The continuation of certain activities (agriculture, grazing, handicrafts, etc.) is promoted, supported by controlled recreation aimed at the social, cultural, and economic promotion of the resident populations, in which these populations actively and consciously participate. |
| **Classified places, sites, ensembles, and objects** | Not applicable | This involves defining areas and measures essential for the landscape conservation of specific natural and/or built occurrences of cultural, scientific, technical, or other interest. These may include villages, rural settlements, archaeological sites, ruins, distinctive landforms, rock formations, isolated or grouped trees, and characteristic ecological communities. |

| Decree-Law 613/76 - New nature protection regime and creation of national parks | | |
|---|---|---|
| **Categories** | **Subcategories** | **Description** |
| **Natural Parks** | Not applicable | They are areas of territory, properly organised, aimed at recreation, nature conservation, landscape protection, and promotion of rural populations, which may encompass both public and private property, where zoning establishes the capabilities and uses of different land parcels.<br><br>The natural park may encompass one or more areas with the different types previously mentioned, which are integrated into a functional structure with specific regulations included in the overall regulation. |
| **Areas that specially ensure the biological balance of the regional landscape** | **Special Ecological Areas** | Areas of high ecological value, both in terms of productivity and the nature and quality of the products, in which the maintenance of fertility and the capacity for renewal of natural resources and which guarantee the biological balance of the regional landscape must be ensured. |
| | **Special Agricultural or Forestry Areas** | Areas of high agricultural or forestry value, both in terms of the biomass produced and the nature and quality of the products, where the maintenance of fertility should be ensured. They are, therefore, areas where certain agricultural and forestry developments are a priority, and which guarantee the biological balance of the regional landscape. |
| | **Degraded Areas to be Rehabilitated** | Areas where the soil or vegetation has been destroyed and require special measures for their restoration with a view to utilisation to be determined by national and regional programme. |
| | **Underground Reserve Areas** | Areas with available resources, minerals or aquifers, in the subsoil, which it is important to safeguard for appropriate use. |



**Table 23** Deduced Landscape Proposal Map for Vila do Conde, Póvoa de Varzim and Esposende based on Ilídio de Araújo vision

| **Categories** | **Subcategories** | **Deduced Landscape Proposal for Vila do Conde, Póvoa de Varzim and Esposende** |
|---|---|---|
| **Recreation reserves** | The entire coastal strip of sandy and rocky beaches and the contiguous strip of dry land up to 200 meters from the highest high-tide line of spring tides, as well as the intertidal maritime zone, except for cultivated areas in dry land | A 200-meter buffer, adjusted to exclude cultivated areas, has been included on the map to represent the recreation reserve along the coastline. |
| | Estuaries and navigable rivers and their respective banks to a depth of 10 meters | Due to the scale used in the map, these buffers are not represented. |
| | Non-navigable rivers and their banks, extending 2 meters beyond the winter bed adjacent to cultivated lands, or 5 meters in other areas | |
| | Pedestrian routes | Ilídio de Araújo does not identify these in the case studies, as the information he provided is incomplete and does not allow us to determine whether they would be included in his proposal. |
| | Historical routes and roads of recreational interest | |
| | Viewpoints with panoramas of particular recreational effect | |
| | Places and sites with monumental or picturesque ensembles | |
| **Protected landscapes** | The entire coastal strip from the Minho estuary to the Lima estuary | The area is not included in our case studies. |
| | The available information does not allow us to conclude whether the author would propose other protected landscapes | The available information does not allow us to conclude whether the author would propose other protected landscapes |
| **Classified places, sites, ensembles, and objects** | Sites or monuments of cultural interest | Ilídio de Araújo does not identify these in the case studies, as the information he provided is incomplete and does not allow us to determine whether they would be included in his proposal. |
| | Recreational (historical) farms with cultural interest | |

| Categories | Subcategories | Deduced Landscape Proposal for Vila do Conde, Póvoa de Varzim and Esposende |
|---|---|---|
| **Natural Parks** | The entire coastal strip from Caminha to Cortegaça | Category included in the deduced landscape proposal |
| **Special Ecological Areas**<br>[some areas could also be classified as a integral or partial nature reserve] | Estuary and their marshes | Category included in the deduced landscape proposal |
| | Streams with more than 2km of course | |
| | Coastal lagoons | |
| | Dunes | |
| | Beaches | |
| | Coastal rocks | |
| | Coastal heath – Cisto-Ulicetum humilis | |
| **Special Agricultural Areas** | Soils with the highest agricultural suitability | Category included in the deduced landscape proposal |
| **Special Forest Areas** | All tree formations existing within 500 meters of the high tide line / ecological protection tree curtain (existing or to be created) | The information provided by Ilídio de Araújo is incomplete and does not specify which areas should prioritise soil protection or soil regeneration. Therefore, we have identified the 500-meter buffer on the map where afforestation should be promoted and have also mapped the existing forested areas within it. |
| | Mandatory afforestation areas (soil protection or soil regeneration) | |
| **Underground Reserve Areas** | Underground Reserve Areas | Ilídio de Araújo does not identify these in the case studies, as the information he provided is incomplete and does not allow us to determine whether they would be included in his proposal. |
| **Degraded Areas to be Rehabilitated** | Landscape integration of panoramic roads | Ilídio de Araújo does not identify these in the case studies, as the information he provided is incomplete and does not allow us to determine whether they would be included in his proposal. |
| | Landscape integration of monuments and scenic spots | |
| | Landscape integration of quarries, gravel pits, sandpits | |
| | Landscape integration of infrastructure lines (energy, telecommunication) and their stations | |
| | Demolitions (ecological and landscape sensitive areas) | |
| | Areas with high levels of pollution (industrial areas, landfills and dumps, polluted stretch of water stream) | |
| | Beach access points (roads and parking lots) | |
| | Channelised watercourses | |
| **Urban intervention areas** | Clusters 3km | Ilídio de Araújo only identifies the 1 km clusters in Póvoa de Varzim and Vila do Conde; therefore, we have only included this subcategory on the map. Information for Esposende is not available. |
| | Clusters 1km | |
| | Degraded areas to be restored through urban intervention | |

While some classifications could be directly inferred from Araújo's (1978) available documents, others required careful extrapolation, particularly in cases where the original data was incomplete. For instance, the recreation reserve buffer along the coastline was reconstructed by adjusting a 200-meter buffer zone while excluding cultivated areas. Similarly, while Araújo (1978) identified 1 km urban clusters in Póvoa de Varzim and Vila do Conde, no information was available for Esposende, so we refrained from making unsupported assumptions.

Figure 13 and Figure 14 visually illustrate these findings. Figure 3 provides an example of Araújo's (1978) original landscape planning/ protection maps (see Appendix 12 for all available images), while Figure 14 presents the reconstructed landscape proposal map for our study area.

**Figure 13** Example of a Landscape Planning/Protection Map in Volume I produced by Araújo (1978) (see Appendix 12 for all available images). © SIPA – Sistema de Informação para o Património Arquitetónico, Portugal, used with permission

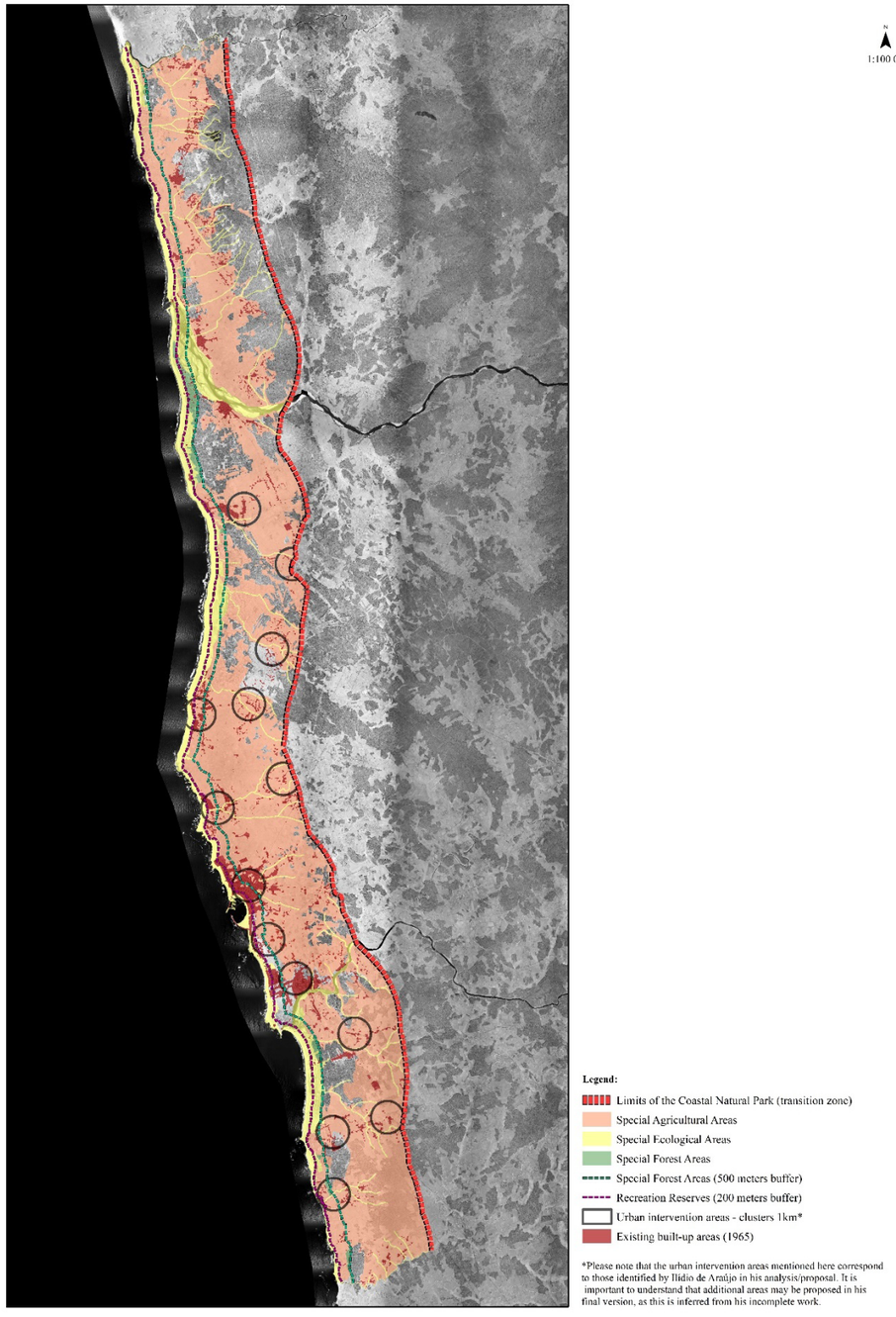



**Figure 14** Deduced Landscape Proposal Map for Vila do Conde, Póvoa de Varzim and Esposende based on Ilídio de Araújo vision

### 9.2.5. Coupling analysis of the planning proposals and LULC changes

Finally, we compared the results of the LULC analysis with the insights gained in the previous step to determine the relationship between the level of landscape integration and the effectiveness of the protection of the coastal landscape.

## 9.3. Results

### 9.3.1. How has the coastal landscape evolved?

#### *9.3.1.1. LULC mega classes and classes analysis*

The Mega Classes (Figure 15) and Classes (Figure 16) of Vila do Conde, Póvoa de Varzim, and Esposende reveal significant landscape changes from 1965 to 2018, reflecting shifts in artificialised surfaces, agriculture, forests, and other LULC mega classes and classes. These changes highlight the distinct development trajectories of each case study, shaped by urbanisation, agricultural practices, and forest management. For a detailed graphical representation of the LULC mega classes and classes evolution, see Figure 25 and Appendix 13.

In 1965, all three municipalities were predominantly agricultural, reflecting the then Portugal's rural character. At the time, approximately 40% of the Portuguese population worked in agriculture (Schmidt (2023) quoting Barreto (1996)), highlighting the importance of farming for both the economy and food production (Pereira-dos-Santos, 2014). Vila do Conde had 52% of its land dedicated to agriculture, Póvoa de Varzim 71,35%, and Esposende 47,05%. Forest cover, particularly Pinus pinaster, was also notable, with Esposende having the highest percentage at 32,3%. Artificialised surfaces were minimal, with Vila do Conde and Póvoa de Varzim at 7,51% and 8,31%, respectively, and Esposende at 4,65%. These low levels of urbanisation reflected the limited infrastructure of the time. However, this would change due to internal migration towards coastal cities and later, as a result of the 1974 Carnation Revolution and the return of half a million Portuguese from former African colonies (Campos & Ferrão, 2018; Pinho, 1985; Schmidt, 2023). Additionally, urban and infrastructure development received a significant boost after Portugal acceded to the European Economic Community (now the European Union) in 1986. Over time, urbanisation, agricultural intensification, and forest transitions significantly altered these landscapes, with each case study following unique yet interconnected patterns.

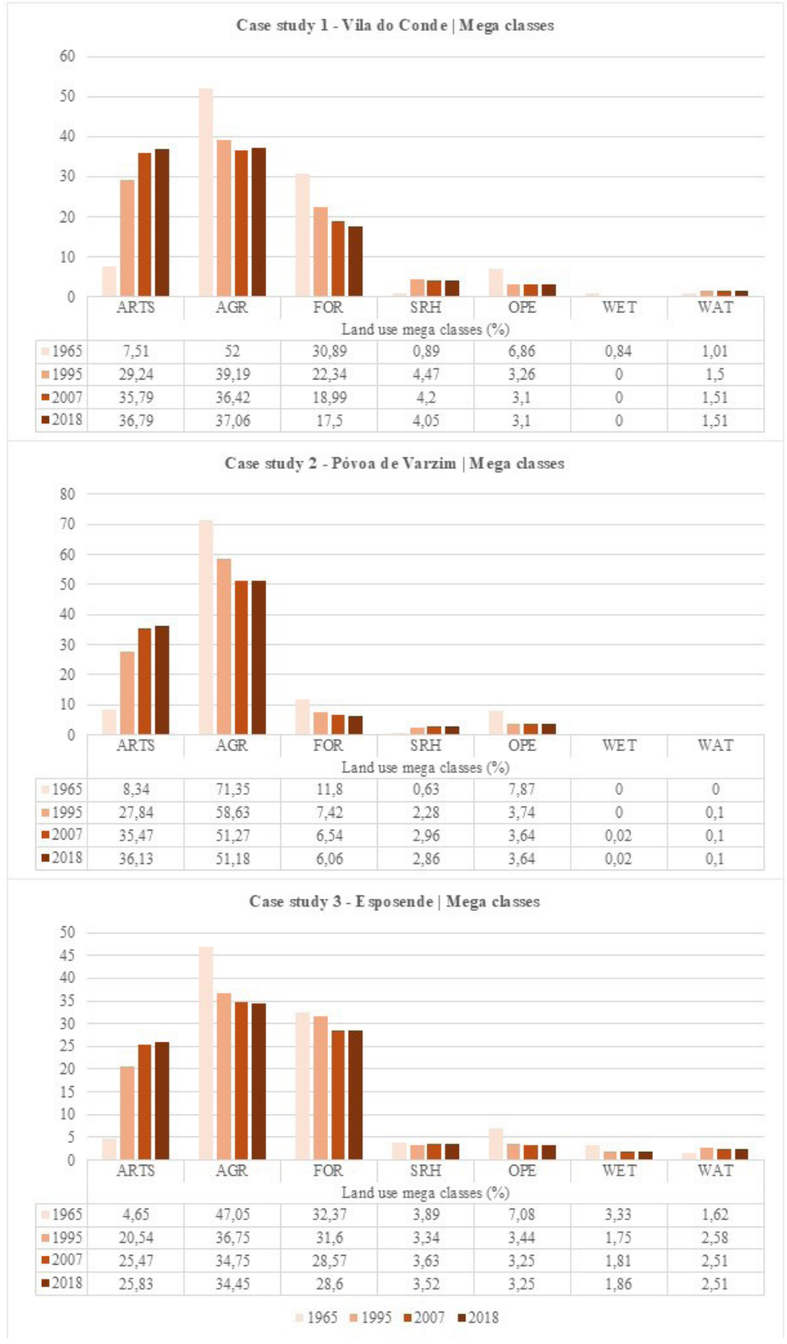



**Figure 15** Percentage of areas for each LULC Mega Classes described in Table 18, for the years 1965, 1995, 2007, and 2018 in Vila do Conde, Póvoa de Varzim and Esposende

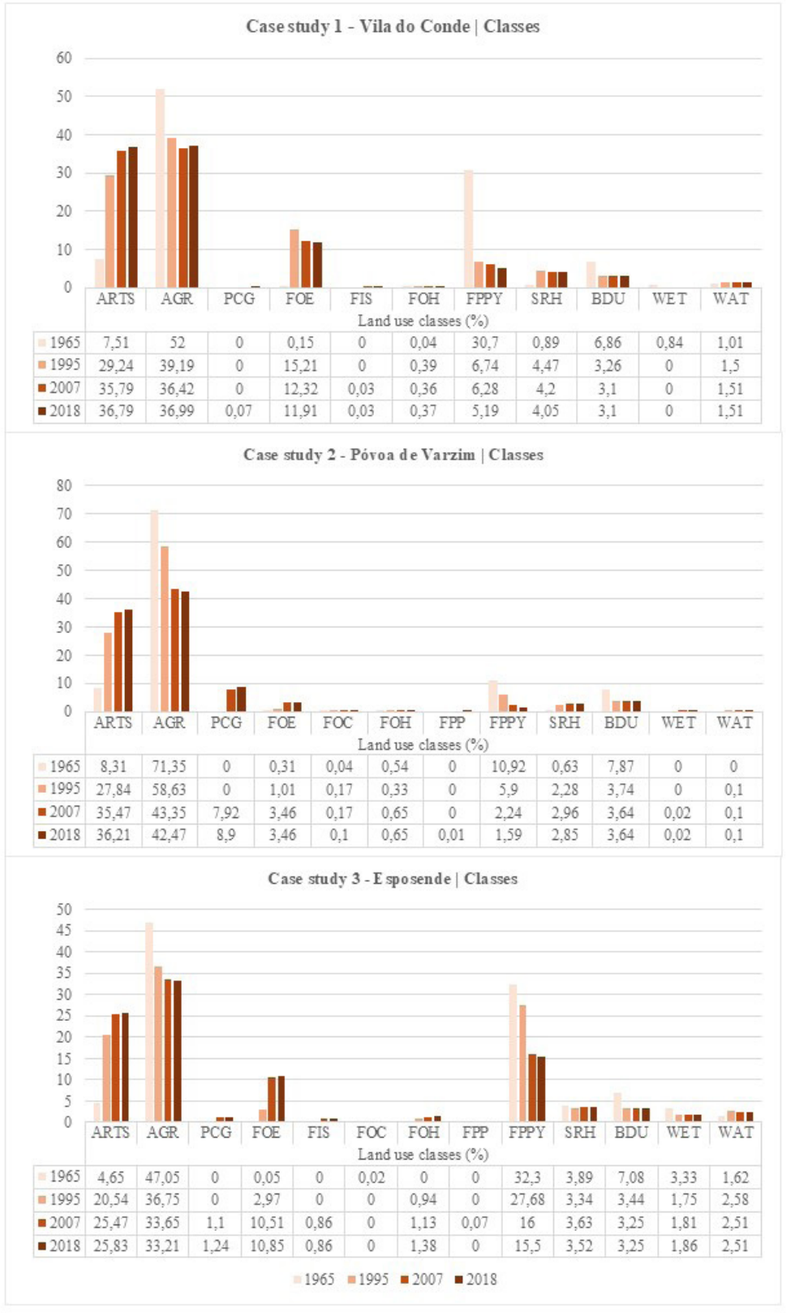



**Figure 16** Percentage of areas for each LULC Classes described in Table 18, for the years 1965, 1995, 2007, and 2018 in Vila do Conde, Póvoa de Varzim and Esposende

### Vila do Conde

In 1965, Vila do Conde was characterised by a balance between agriculture (52%) and forests (30,7% *Pinus pinaster*). The *campo-bouça*[33] (crops-small woods) system, an agroforestry arrangement of fields and small woods (Oliveira et al., 2007), played a central role in the municipality (Figure 17). Beaches and dunes represented 6,86%, with a minimal representation of wetlands and water areas, despite the presence of the River Ave (Figure 11). By 1995, urbanisation had surged, with artificialised surfaces rising to 29,24%, while agriculture declined to 39,19%. Forests of *Pinus pinaster* decreased to 6,74%, replaced by eucalyptus forests, which grew to 15,21%. Urban expansion continued at a slower pace, reaching 35,79% by 2007 and 36,79% by 2018. Agriculture stabilized at 36,99%, while *Pinus pinaster* forests further declined to 5,19%. Eucalyptus forests remained steady at 11,91%, and (plastic-covered) greenhouses appeared minimally (0,07%), indicating a shift towards intensive agricultural practices.

33 The *campo-bouça* system is an agroforestry system characteristic of the Northern Portugal, defined by a distinctive spatial arrangement of agricultural crops (in the fields bordered by fruit trees) and forest species (in the bouça). The campo refers to the part of the farming operation designated for forage crops, used for feeding animals (either fresh or preserved), as well as for grain crops for human consumption and textile fibre production. The bouça, on the other hand, consists of small woods of deciduous or mixed trees that temporarily serve as forested areas within agricultural operations. These woodlands feature underbrush of broom, which was essential for fertiliser production (Oliveira et al., 2007). Along with our case studies, the *campo-bouça* system plays a central role primarily in the municipalities of Póvoa de Varzim and Vila do Conde. However, within our intervention area, the *campo-bouça* system is primarily located in Vila do Conde.

**Figure 17** Example of the campo-bouça system in 1965 in Vila do Conde, offering a snapshot of the traditional agricultural landscape in the Municipality during that time. © extract from the aerial images of 1965, The Northen Region Coordination and Development Commission and Directorate-General for the Territory, Portugal, used with permission

### Póvoa de Varzim

Póvoa de Varzim had the highest agricultural share in 1965 (71,35%), alongside 10,92% *Pinus pinaster* forests and 8,31% artificialised surfaces. The *masseiras*[34], a traditional agricultural system unique to the Northern Portugal region, particularly in Póvoa de Varzim and Esposende (Sánchez & Cuellar, 2016), were prominent (Figure 18). Designed to optimise moisture retention and protect crops from coastal winds, it reflected the deep connection between local communities and the coastal environment. Additionally, the historical practice of seaweed (*sargaço*) harvesting, in which women played a key role in collecting it for fertilisation, highlights the cultural significance of these agricultural landscapes (Figure 19). Beaches and dunes had a significant presence at 7,87%. By 1995, urbanisation had risen to 27,84%, and agriculture declined to 58,63%. *Pinus pinaster* forests decreased to 5,9%, while eucalyptus forests began to appear (1,01%).

34 While similar systems can be found in Andalusia (the navazo) and the Gaza Strip, Israel, and North Sinai (the Mawasi), each of these systems has distinct characteristics influenced by local conditions, such as varying rainfall levels (Sánchez & Cuellar, 2016). Unfortunately, in Gaza, these systems were almost certainly destroyed or severely impacted by the ongoing war in the region.

**Figure 18** Example of masseiras in 1965 in Estela, Póvoa de Varzim, where it possible to observe the landscape pattern created by cultivating crops in depressions dug into the dunes. This technique creates a microclimate that shields plants from coastal winds and preserves soil moisture. © extract from the aerial images of 1965, The Northen Region Coordination and Development Commission and Directorate-General for the Territory, Portugal, used with permission

**Figure 19** Harvesting of seaweed in the 1950s/60s in Póvoa de Varzim / © Arquivo Municipal de Lisboa | Mulheres com trouxas de sargaço [Women with bundles of seaweed], Artur Pastor, PT/AMLSB/ART/009/011127. In this picture, we can see women carrying "sargaço". This was a labour-intensive task, as the "sargaço" was collected from the shore and transported in heavy bundles by women to enrich the soil of the masseira fields. This practice not only supported the agricultural productivity of the region but also holds deep cultural significance, reflecting the resilience and resourcefulness of the local community in adapting to their coastal environment

By 2007, artificialised surfaces reached 35,47%, and agriculture fell to 43,35%. A notable shift was the growth of (plastic-covered) greenhouses (7,92%), reflecting agricultural intensification, especially considering that Póvoa de Varzim has a more robust agricultural tradition centred on horticultural production compared to the other case studies. By 2018, urbanisation peaked at 36,21%, and agriculture stabilized at 42,47%. (Plastic-covered) greenhouses expanded to 8,9%, occupying most of the *masseiras,* which have nearly disappeared (Aguiar et al., 2012) (Figure 20). European Union subsidies also drove Póvoa de Varzim's (plastic-covered) greenhouse growth through the Common Agricultural Policy, which contributed to altering the coastal landscape, a trend mirrored globally (Acharki & Kozhikkodan Veettil, 2023). *Pinus pinaster* forests declined further to 1,59%, while eucalyptus forests remained minimal.

**Figure 20** *Masseiras* in 2023 in Estela, Póvoa de Varzim. © Extract from google earth

### Esposende

Esposende had a more balanced landscape in 1965, with 47,05% agriculture, 32,3% *Pinus pinaster* forests, and 4,65% artificialised surfaces. Wetlands along the Cávado estuary accounted for 3,33% (Figure 21), alongside beaches and dunes, which had a presence of 7,08%.

**Figure 21** Comparison between the Cávado and Ave estuaries and their wetlands in 1965. © Extract from the aerial images of 1965, The Northen Region Coordination and Development Commission and Directorate-General for the Territory, Portugal, used with permission

By 1995, urbanisation increased to 20,54%, and agriculture declined to 36,75%. *Pinus pinaster* forests remained relatively high at 27,68%, while eucalyptus forests grew to 2,97%. Wetlands areas in Esposende also saw a slight decline due to urban development along the Cávado estuary and in the Ofir region (see Appendix 14 for more details). Urban expansion continued at a slower pace, reaching 25,47% by 2007 and 25,83% by 2018. Agriculture stabilized at 33,21%, while *Pinus pinaster* forests declined to 15,5%. Eucalyptus forests expanded significantly to 10,85%, and wetlands slightly recovered to 1,86%. Esposende maintained higher forest and wetland coverage compared to the other case studies, partly due to its sloped terrain and lower urban pressures along the intervention area. As is visible in Figure 22, this case study includes areas that partially comprise a fossil cliff, contributing to its higher percentage of forest cover when compared to the other two predominantly flat case studies.



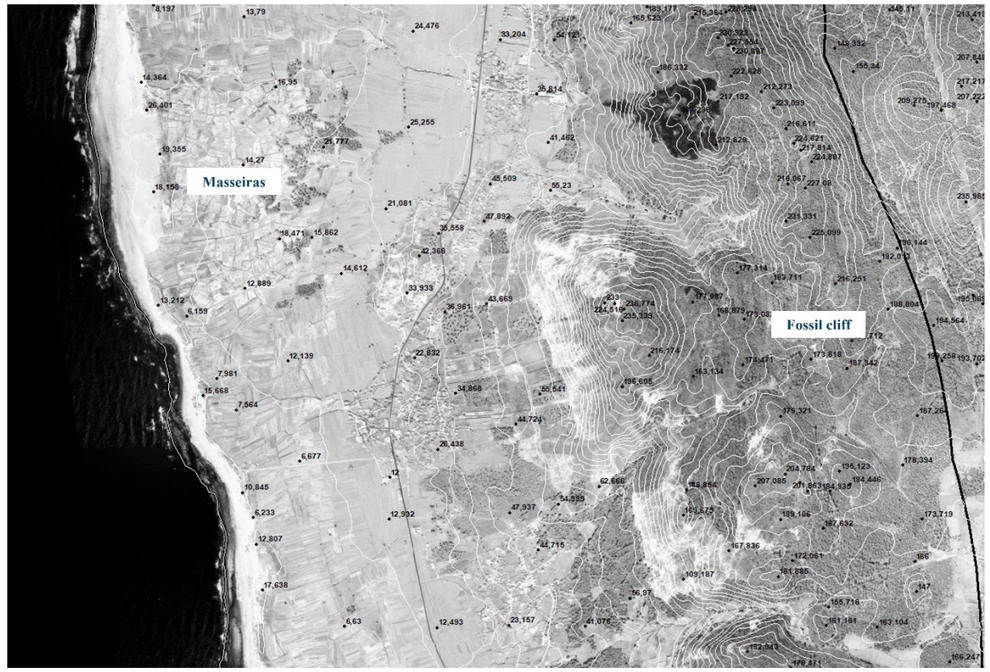



**Figure 22** A section of the fossil cliff in Esposende in 1965 with the contour lines. © Extract from the aerial images of 1965, The Northen Region Coordination and Development Commission and Directorate-General for the Territory, Portugal, used with permission

### Cross-Comparison

The three case studies show distinct yet interconnected trends in LULC changes. Vila do Conde and Póvoa de Varzim, both part of the Porto Metropolitan Area, experienced more substantial urban growth, with artificialised surfaces surpassing 36% by 2018. In contrast, Esposende, located within the Intermunicipal Community of Alto Minho, exhibited more moderate urbanisation, retaining larger agricultural and forested areas. This difference is likely due to Esposende's stronger connection to Viana do Castelo and its distance from the rapid urban pressures of the Porto metropolitan area. In all case studies, urban development occurred along existing built-up areas of 1965 and the main roads, as well as those that were constructed over time (Figure 23).

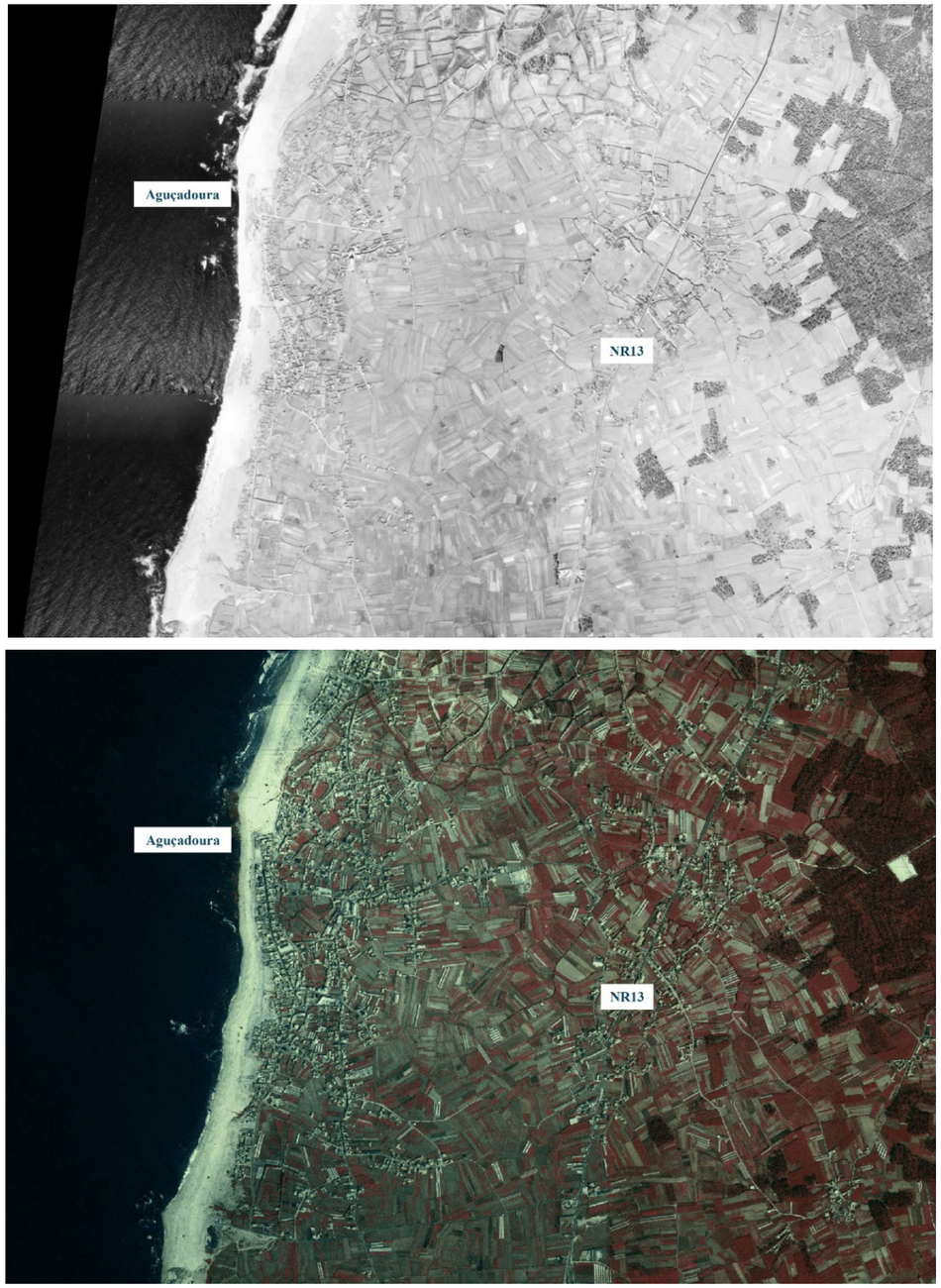



**Figure 23** Example of urban development in Póvoa de Varzim between 1965 and 1995 (orthophotomap in false colour), highlighting growth along the main roads and existing urban areas. © Extract from the aerial images of 1965, The Northen Region Coordination and Development Commission and Directorate-General for the Territory, Portugal, used with permission, and extract from 1995 orthophotomap, Directorate-General for the Territory



Agriculture declined in all regions, but Póvoa de Varzim maintained the highest levels, driven by the rise of plastic-covered greenhouses since 2007[35]. This shift reflects a broader trend of agricultural intensification, supported by European Union subsidies. Traditional systems like the *masseiras* and *campo-bouça* have nearly disappeared, replaced by more intensive practices and simplified landscapes.

Forest cover also varied significantly. Vila do Conde and Póvoa de Varzim saw substantial declines in *Pinus pinaster* forests, replaced by eucalyptus plantations. Esposende retained higher forest coverage, particularly *Pinus pinaster*, due to its sloped terrain and lower development pressures. Wetlands and water areas remained minimal across all case studies, except for Esposende, which consistently maintained higher wetland coverage due to the Cávado estuary. Although the primary focus of our analysis was not on this aspect, during the mapping of the 1965 LULC, we observed the presence of higher concentrations of trees, hedgerows, and walls that delineated property boundaries. This highlights a notable contrast with the simplified landscape seen in later years, where many of these defining features, such as trees, edges, and walls, have disappeared (Figure 24).

Overall, the LULC changes in these case studies reflect broader regional and European trends, including urbanisation, agricultural intensification, and forest transitions (Plieninger et al., 2016; Primdahl et al., 2019).

35 In the following "plastic-covered greenhouses" will be simply referred to by "greenhouses".

**Figure 24** A relatively stable area in Vila do Conde from 1965 to 2023 illustrates landscape simplification and the conversion of forest areas into agriculture- The simplification is reflected in the reduction of hedgerows. While field boundaries remain visible, they are no longer defined by hedgerows, leading to a more uniform agricultural landscape. © Extract from the aerial images of 1965, The Northen Region Coordination and Development Commission and Directorate-General for the Territory, Portugal, used with permission, and extract from Google Earth (2023)

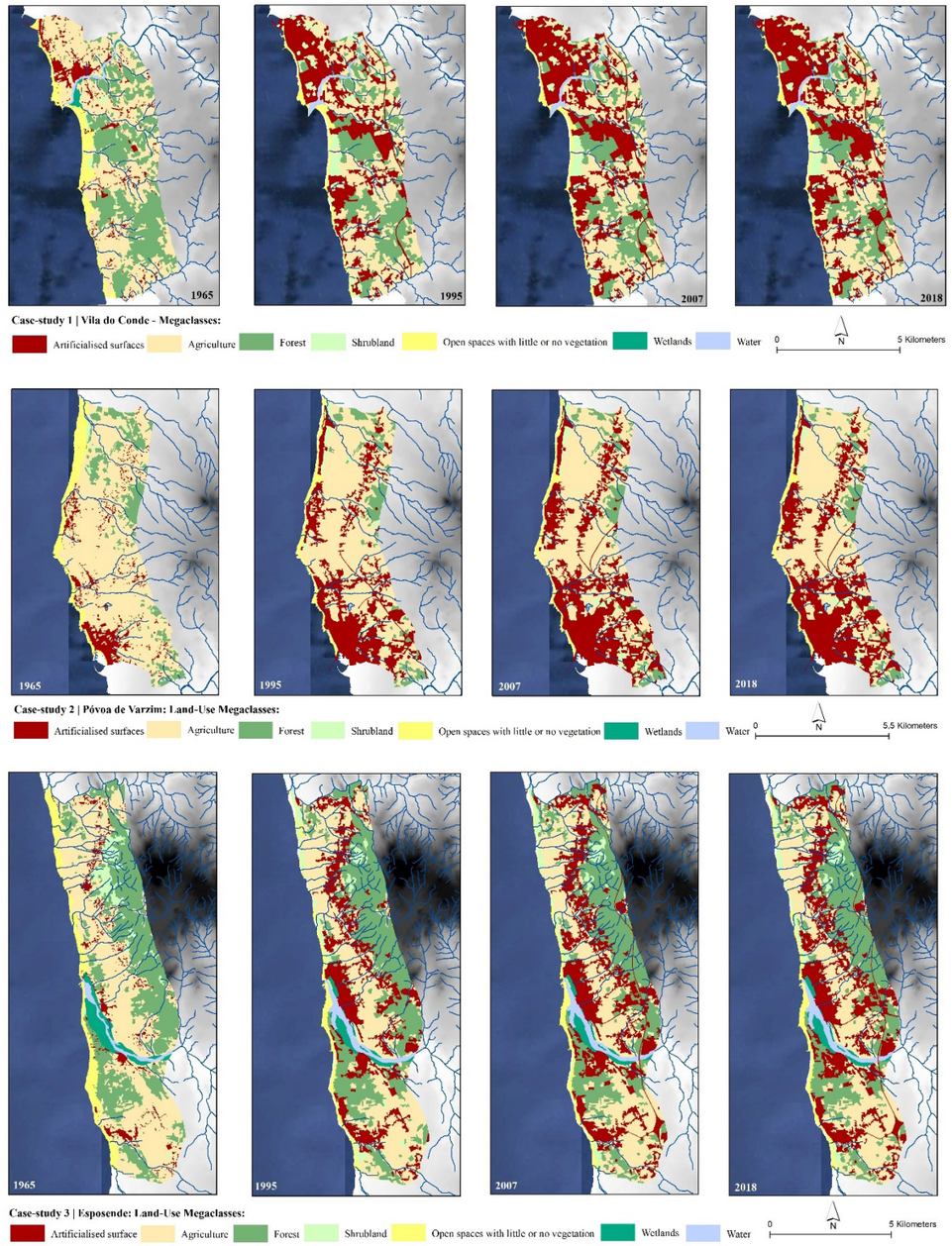
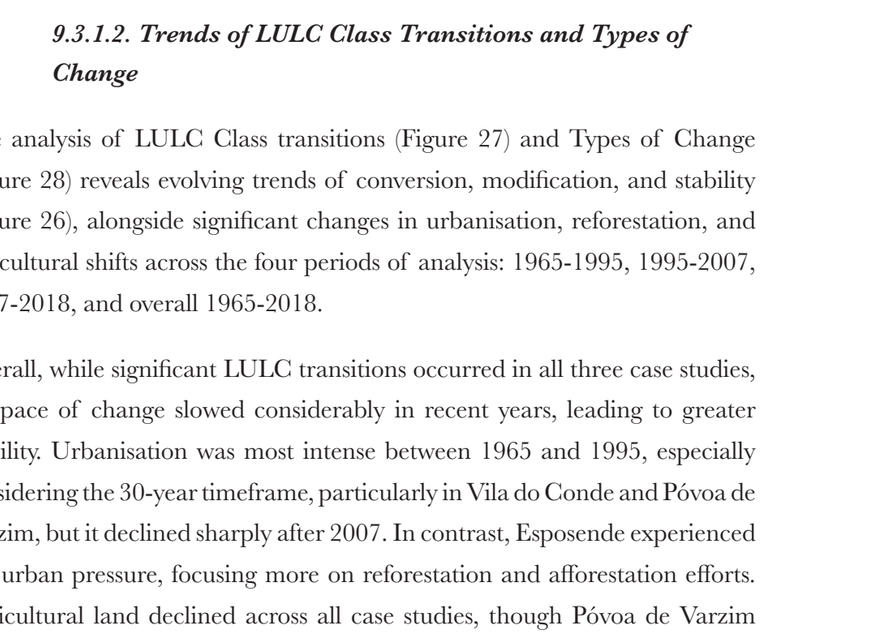



**Figure 25** Evolution of the LULC Mega classes between 1965 and 2018 in Vila do Conde, Póvoa de Varzim and Esposende

### *9.3.1.2. Trends of LULC Class Transitions and Types of Change*

The analysis of LULC Class transitions (Figure 27) and Types of Change (Figure 28) reveals evolving trends of conversion, modification, and stability (Figure 26), alongside significant changes in urbanisation, reforestation, and agricultural shifts across the four periods of analysis: 1965-1995, 1995-2007, 2007-2018, and overall 1965-2018.

Overall, while significant LULC transitions occurred in all three case studies, the pace of change slowed considerably in recent years, leading to greater stability. Urbanisation was most intense between 1965 and 1995, especially considering the 30-year timeframe, particularly in Vila do Conde and Póvoa de Varzim, but it declined sharply after 2007. In contrast, Esposende experienced less urban pressure, focusing more on reforestation and afforestation efforts. Agricultural land declined across all case studies, though Póvoa de Varzim adapted through the expansion of greenhouse areas. By 2007-2018, the "No Change" category became dominant, indicating a shift from rapid transformation toward stability, with fewer large-scale conversions and only minor modifications in LULC (Table 24). Detailed maps and percentages for each case study are provided in Appendices 15 and 16.




| | Vila do Conde | | | | Póvoa de Varzim | | | | Esposende | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1965-1995 | 1995-2007 | 2007-2018 | 1965-2018 | 1965-1995 | 1995-2007 | 2007-2018 | 1965-2018 | 1965-1995 | 1995-2007 | 2007-2018 | 1965-2018 |
| Conversion | 35,06 | 10,19 | 3,07 | 43,50 | 28,44 | 10,78 | 1,77 | 37,58 | 30,39 | 7,51 | 1,54 | 36,29 |
| Mofidication | 14,05 | 0,94 | 0,68 | 10,92 | 1,64 | 10,85 | 1,01 | 11,07 | 2,85 | 9,60 | 0,55 | 10,99 |
| No change | 50,89 | 88,87 | 96,25 | 45,57 | 69,92 | 78,36 | 97,23 | 51,34 | 66,76 | 82,90 | 97,91 | 52,72 |

**Figure 26** ULC Class Transitions in Vila do Conde, Póvoa de Varzim, and Esposende (units: %)



**Table 24** Types of change (%)

| Types of change | Vila do Conde (%) | | | | Póvoa de Varzim (%) | | | | Esposende (h%) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1965 - 1995 | 1995 - 2007 | 2007 - 2018 | 1965 - 2018 | 1965 - 1995 | 1995 - 2007 | 2007 - 2018 | 1965 - 2018 | 1965 - 1995 | 1995 - 2007 | 2007 - 2018 | 1965 - 2018 |
| **No change** | 50,89 | 88,87 | 96,25 | 45,57 | 69,92 | 78,36 | 97,23 | 51,34 | 66,76 | 82,90 | 97,91 | 52,72 |
| **Urbanisation** | 22,53 | 6,69 | 1,25 | 30,04 | 19,85 | 7,68 | 0,92 | 28,12 | 16,11 | 4,96 | 0,24 | 21,28 |
| **Regeneration** | 0,24 | 0,08 | 0,14 | 0,29 | 0,04 | 0,03 | 0,02 | 0,04 | 0,02 | 0,00 | 0,10 | 0,02 |
| **Agricultural expansion** | 0,64 | 0,63 | 0,11 | 0,82 | 1,07 | 0,50 | 0,16 | 1,11 | 0,72 | 0,08 | 0,32 | 0,60 |
| **Agricultural expansion with deforestation** | 4,60 | 1,17 | 1,12 | 5,97 | 3,70 | 0,78 | 0,66 | 4,77 | 2,44 | 0,85 | 0,22 | 2,79 |
| **Agricultural transition** | 0,00 | 0,00 | 0,07 | 0,07 | 0,00 | 7,78 | 0,95 | 7,15 | 0,00 | 1,06 | 0,20 | 1,09 |
| **Reforestation** | 14,05 | 0,93 | 0,61 | 10,85 | 1,64 | 3,24 | 0,05 | 3,92 | 2,85 | 7,81 | 0,34 | 9,72 |
| **Afforestation** | 2,08 | 0,32 | 0,17 | 1,85 | 1,86 | 0,11 | 0,00 | 1,50 | 7,50 | 0,80 | 0,47 | 7,09 |
| **Establishment of invasive species** | 0,00 | 0,03 | 0,00 | 0,03 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,86 | 0,00 | 0,85 |
| **Deforestation** | 1,55 | 0,40 | 0,00 | 1,44 | 0,30 | 0,07 | 0,00 | 0,13 | 0,34 | 0,36 | 0,06 | 0,45 |
| **Abandonment** | 1,90 | 0,84 | 0,27 | 1,64 | 0,87 | 1,42 | 0,01 | 1,75 | 0,51 | 0,27 | 0,06 | 0,68 |
| **Submergence** | 0,32 | 0,00 | 0,00 | 0,34 | 0,00 | 0,00 | 0,00 | 0,00 | 1,17 | 0,00 | 0,00 | 1,12 |
| **Water to land transition** | 0,36 | 0,00 | 0,00 | 0,26 | 0,01 | 0,00 | 0,00 | 0,01 | 0,73 | 0,03 | 0,07 | 0,69 |
| **Land to water transition** | 0,84 | 0,02 | 0,00 | 0,83 | 0,73 | 0,02 | 0,00 | 0,13 | 0,85 | 0,03 | 0,00 | 0,91 |

#### Vila do Conde

In Vila do Conde, LULC became increasingly stable, with the proportion of unchanged land rising from 50,89% (1965-1995) to 96,25% (2007-2018). LULC conversion, which includes significant shifts such as agricultural land turning into urban areas or forests, dropped significantly from 35,06% to 3,07%, while minor modifications, representing smaller-scale alterations in LULC, fell from 14,05% to 0,68%. The most notable change occurred between 1965 and 1995, a 30-year period, during which urban expansion was particularly intense, covering 22,53% of the area. However, this rate of

urbanisation slowed significantly in the following periods, dropping to 6,69% between 1995 and 2007, and further to just 1,25% between 2007 and 2018. In contrast, reforestation, which peaked at 14,05% in 1965-1995, nearly disappeared by the most recent period (0,61% in 2007-2018). Agricultural land showed a minor decline from 39,19% to 36,99%, suggesting a balance between loss and stability.

### Póvoa de Varzim

A similar trend was observed in Póvoa de Varzim, where LULC stability increased from 69,92% (1965-1995) to 97,23% (2007-2018). LULC conversion fell sharply from 28,44% (1965-1995) to just 1,77% (2007-2018), while modifications fluctuated, peaking at 10,85% (1995-2007) due to the expansion of greenhouses, before decreasing again. The municipality also saw a substantial slowdown in urbanisation, which reached 19,85% in 1965-1995 (30 years), but dropped to 0,92% by 2007-2018. Agricultural land declined more significantly than in Vila do Conde, decreasing from 71,35% in 1965 to 42,47% in 2018, although this was partially offset by an increase in greenhouse areas to 8,9%. Meanwhile, reforestation and afforestation were modest, with 3,24% of land reforested between 1995-2007.

### Esposende

In Esposende, the trend toward stability was even more pronounced, with unchanged LULC reaching 97,91% by 2007-2018. LULC conversion decreased from 30,39% (1965-1995) to just 1,54% (2007-2018), while modifications remained minimal, declining from 2,85% to 0,55%. Urbanisation was significantly lower than in Vila do Conde and Póvoa de Varzim, with 16,11% of land becoming urbanised between 1965 and 1995, but this fell to just 0,24% in 2007-2018, reflecting weaker urban pressures. Unlike the other two case studies, reforestation and afforestation played a central role in Esposende's landscape evolution, with 7,50% of land afforested between 1965-1995 and a peak in reforestation at 7,81% between 1995-2007. Agricultural expansion was minimal, reaching only 1.07% between 1965-1995.

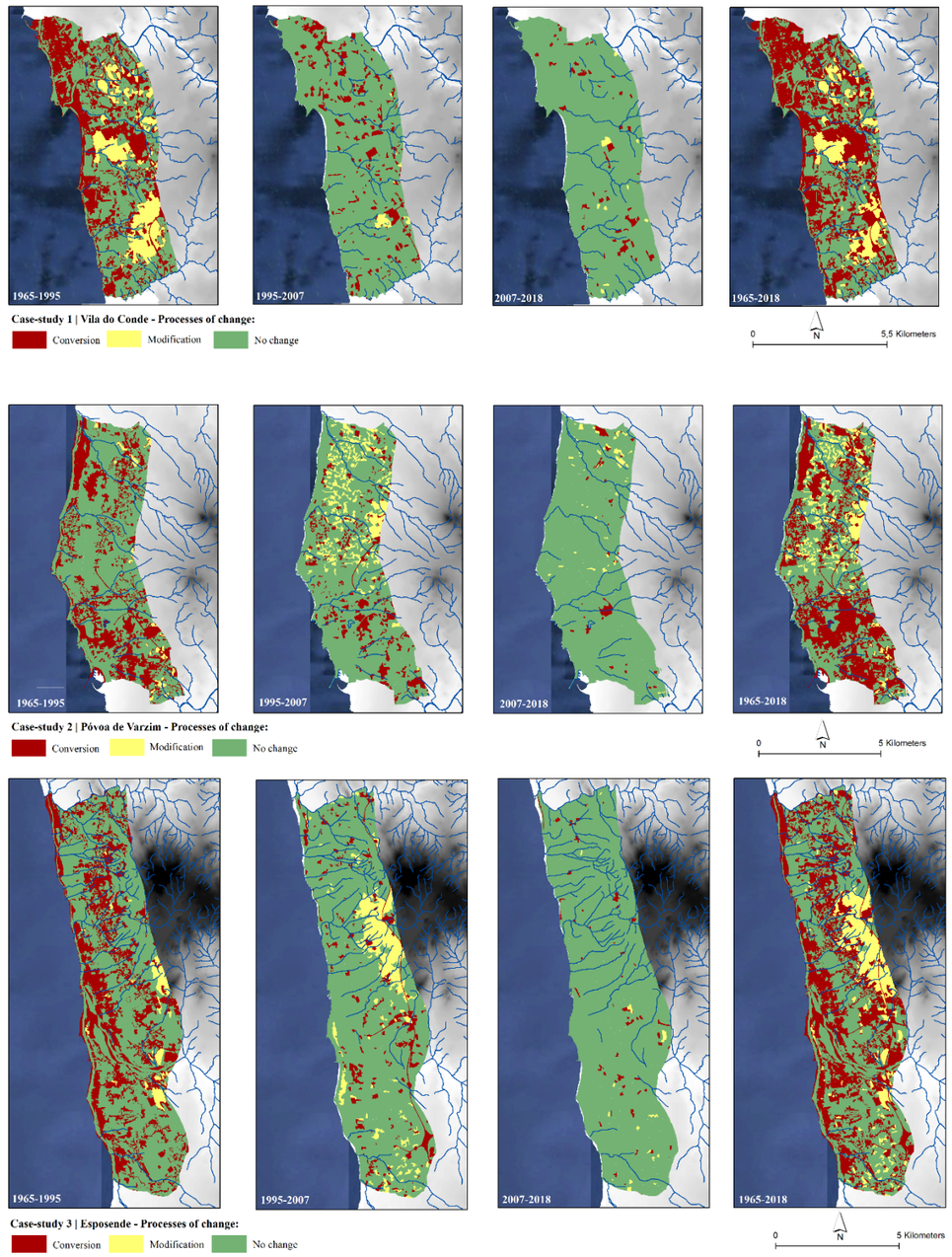



**Figure 27** LULC Classes Transition in Vila do Conde, Póvoa de Varzim and Esposende (1965-1995, 1995-2007, 2007-2018, and 1965-2018)

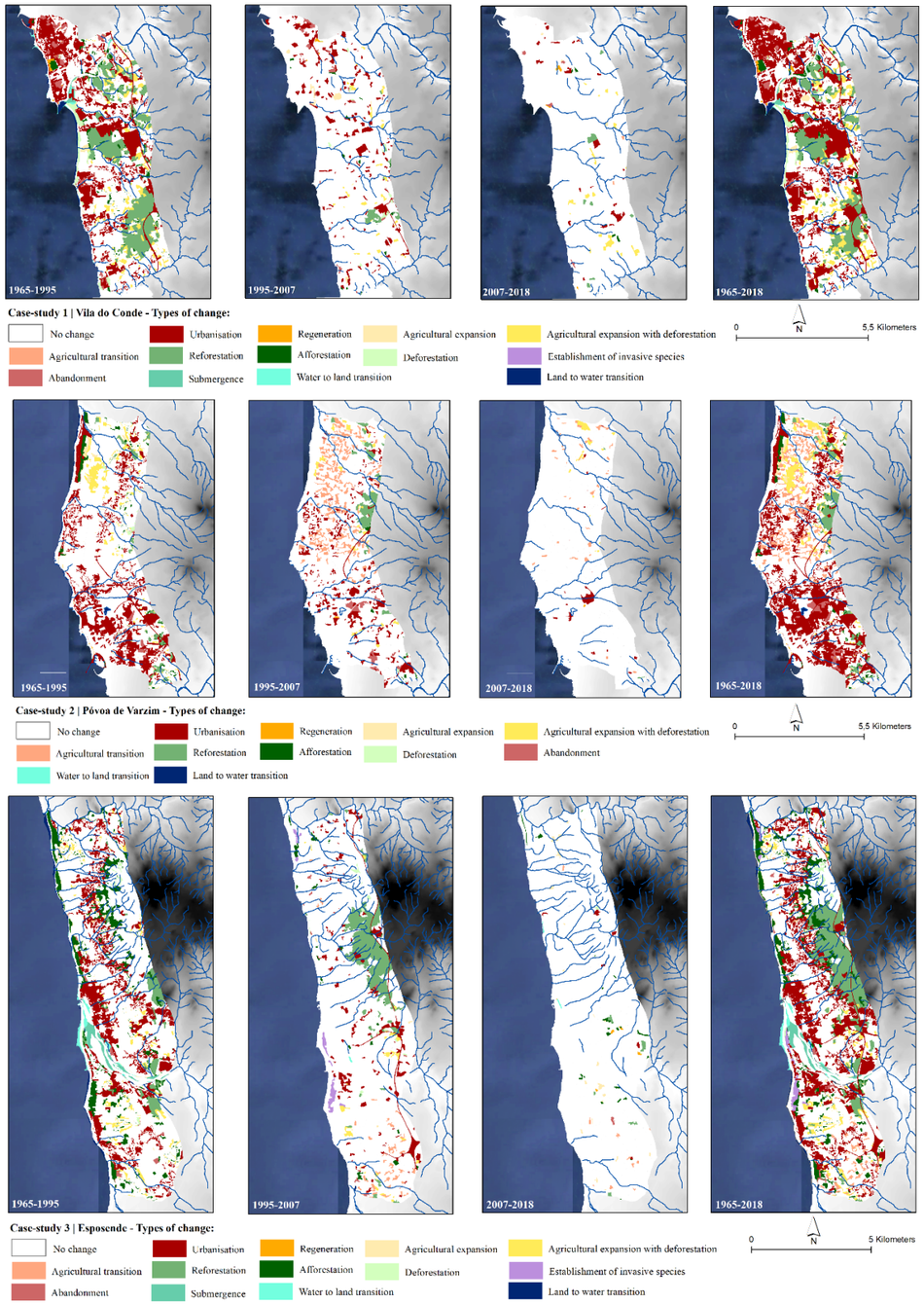



**Figure 28** Types of changes in Vila do Conde, Póvoa de Varzim and Esposende (1965-1995, 1995-2007, 2007-2018, and 1965-2018)



### 9.3.2. How has the landscape been conceptualised and integrated in the LRCZCC 77/78, POOC-CE 1999, and POC-CE 2021?

#### *9.3.2.1. The conceptualisation of landscape in the coastal planning instruments*

Table 25 compares the conceptualisation of landscape across the three coastal management instruments under analysis. The synthesis is based on the findings of Gonçalves and Pinho (2025), focusing on four aspects:

1. Whether each instrument defines the concept of landscape.

2. If not, whether the conceptualisation can be deduced.

3. Whether it addresses the specifics of defining the boundaries of a coastal landscape.

4. Whether landscape units are identified within its intervention area, recognising landscape diversity and identity.

**Table 25** Synthesis of the conceptualisation of the landscape in the LRCZCC 77/78, POOC-CE 1999, and POC-CE 2021 (adapted from Gonçalves and Pinho (2025))

| | LRCZCC 77/78 | POOC-CE 1999 | POC-CE 2021 |
|---|---|---|---|
| **Does it define 'landscape'?** | No. | No. | Yes. The plan defines landscape as *"an essential component of the human environment, expressing the diversity of our common cultural and natural heritage. It forms the basis of local identity, performs important public functions in ecological, environmental, social, and cultural fields, and contributes to human well-being and the strengthening of local identity"*. Despite its holistic conceptualisation, the plan's strategy prioritises biodiversity protection and enhancement. |
| **Is it possible to deduce the conceptualisation of 'landscape'?** | Yes, the study adopts a holistic conceptualisation<br><br>that incorporates the biophysical, socio-cultural, and aesthetic dimensions of a landscape. | Yes, the plan focuses on biophysical and socio-cultural variables, with a stronger emphasis on nature conservation and the protection of the outstanding natural coastal landscape. | n.a. |

| | LRCZCC 77/78 | POOC-CE 1999 | POC-CE 2021 |
|---|---|---|---|
| **Does it define the coastal landscape and establish its boundaries?** | Yes, however, it does not present its graphical representation, as it limits the intervention area to a 3km buffer.<br><br>The study states that *"it is not easy to define the precise contours of a geo-economic-social compartment in the landscape of Northwest Portugal that can be designated as a "coastal strip". However, in some areas, particularly North of the mouth of the Cávado River, such compartmentalisation is quite clearly delineated. But south of that river and up to the Douro, the landscape broadens into a wide plain that runs into the chain of hills formed by the Valongo anticline, stretching about 40 km from the Laúndos hills to the southern end of the Serra de Pias".* | No. The plan focuses on a 500-meter buffer, excluding port jurisdiction areas, as legally required. However, the baseline studies assessed a 3km buffer zone. | No. The plan focuses on a 500-meter buffer, now covering port jurisdiction areas as legally required, following a change in the law that previously excluded these areas. It also extends its boundaries to include the estuaries of the Minho, Lima, Âncora, Neiva, Cávado, Ave, and Douro rivers (with our case studies limited to the Cávado and Ave rivers). While the plan could have extended the buffer to 1km, it chose not to do so without providing a justification for this decision. |
| **Does it define landscape units?** | No, but the study was divided into five volumes, each corresponding to a major river basin, which we deduce could represent distinct landscape units. | Yes, the Baseline Studies defined five landscape units based on variables such as physiography, geology, land use, and notable sites for nature conservation. | Yes, the plan identifies two landscape groups (the Entre Douro e Minho and the Porto Metropolitan Area) based on the *"National Landscape Character Assessment"* for Continental Portugal developed by Cancela-d'Abreu et al. (2004). |



The analysis of Table 25 reveals that the three coastal instruments have different approaches to the conceptualisation of landscape, reflecting the evolution of the landscape debate over time. However, unexpectedly, their development diverges from contemporary landscape science, which today advocates for an integrated approach to all landscapes, as emphasised by the Council of Europe's Landscape Convention (Council of Europe 2000, 2016). Over time, landscape valuation has increased in association with nature-protected areas. The focus has shifted from a holistic approach (LRCZCC 77/78) to a narrower emphasis on nature conservation (POOC-CE 1999) and biodiversity protection (POC-CE 2021).

### LRCZCC 77/78

Although the LRCZCC 77/78 does not provide a formal definition of landscape, Gonçalves and Pinho (2025) deduced a holistic conceptualisation encompassing biophysical, socio-cultural, and aesthetic dimensions. The study explicitly explains what constitutes the coastal landscape but lacks a graphical representation. However, based on Araújo's (1978) description, we were able to delineate the boundaries of the coastal landscape (Figure 29).

Nevertheless, Araújo (1978) restricts the study intervention area to a 3 km buffer, justifying that the LRCZCC 77/78 was only an assessment study developed by the need to safeguard landscape values and restrict urban expansion within a 1 km buffer from the coastline. Araújo (1978) noted that if his goal had been to develop a landscape planning proposal, it would have been necessary to define the coastal landscape's boundaries precisely. Despite this, as stated in the Methods section, he included a chapter and a design proposal on *"Landscape Planning/Landscape Protection"*, though his rationale for doing so remains unclear.

Moreover, the study does not explicitly define landscape units; instead, it is structured into five volumes based on major river basins, suggesting that these may have been considered distinct landscape units by Araújo (1978).

### POOC-CE 1999

The POOC-CE 1999 does not define the concept of landscape. However, Gonçalves and Pinho (2025) concluded that it focuses on biophysical and

socio-cultural variables, with a strong emphasis on nature conservation. It operates within a legally established 500-meter buffer, excluding port jurisdiction areas, although baseline studies assessed a 3 km buffer zone. Five landscape units were defined in the baseline studies based on physiography, geology, land use, and notable conservation sites (Figure 19), but their use in the plan's development is unclear. They appear to be solely employed for characterisation purposes.

**POC-CE 2021**

The POC-CE 2021 explicitly defines the concept of landscape, adopting a holistic conceptualisation aligned with the Convention (Council of Europe 2000, 2016). However, its strategy prioritises biodiversity protection and enhancement. It does not define the coastal landscape in this context or its boundaries, instead relying on a legally established 500-meter buffer (with extensions around estuaries) and identifying two landscape groups based on a 2004 national assessment developed by Cancela-d'Abreu et al. (2004) (Figure 19). However, the programme fails to account for landscape changes over time or to adapt the scale of this 2004 study to the regional context, limiting its relevance for contemporary coastal landscape planning and management.

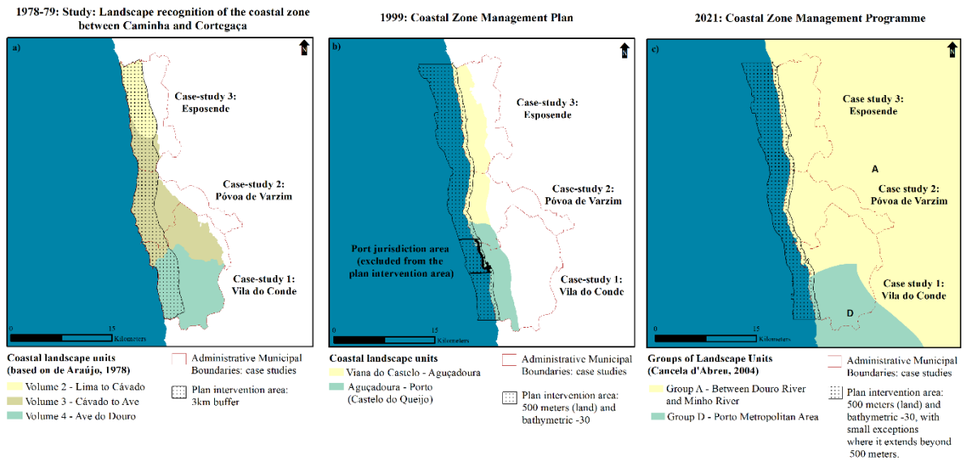



**Figure 29** Comparison of Landscape Units and Buffer Zones across the a) LRCZCC 77/78, b) the POOC-CE 1999, and c) POC-CE 2021



#### *9.3.2.2. The integration of landscape in the coastal institutions*

Gonçalves and Pinho (2025) concluded that multifunctionality, and landscape connectivity and fragmentation were the most addressed criteria across the three plans. Table 26 synthesises the integration of landscape, focusing exclusively on elements with spatial representation in mapped form, as these were directly translated into or influenced the final territorial model of the plan.

**Table 26** Synthesis of the integration of the landscape with spatial representation in the LRCZCC 77/78, POOC-CE 1999, and POC-CE 2021 (adapted from Gonçalves and Pinho (2025))

| LRCZCC 77/78 | POOC-CE 1999 | POC-CE 2021 |
|---|---|---|
| Special Ecological Areas, including the protection of estuaries and their marshes, all the streams with more than 2km of course, coastal lagoons, dunes, beaches, coastal rocks, and the coastal heath of *Cisto-Ulicetum humilis*. | Green corridor using the Public Maritime Domain as a corridor. (Proposal of the Baseline Studies. Not included in the plan approved version) | Green corridors along the waterlines |
| Special Agricultural Areas, including all the soils with the highest agricultural suitability. | Green corridors along the waterlines | National System of Classified Protected Areas |
| Special Forest Areas, along the 500-meter buffer from the highest high-tide line of spring tides, where all forested areas must be preserved and new ones must be created. Urban development should be contained along this buffer. | Mindelo Ornithological Park (Proposal of the Baseline Studies. Not included in the approved version) | Natura 2000 network |
| Classify all the areas as Natural Coastal Park. | Extension of the Protected Coastal Landscape of Esposende until Aguçadoura (Póvoa de Varzim), including the Cávado Estuary.<br><br>(Proposal of the Baseline Studies. Not included in the approved version) | National Ecological Reserve (inferred from the plan analysis, not explicitly mentioned in the plan) |
| Recreation Reserves, along a 200-meter buffer from the highest high-tide line of spring tides. | National Ecological Reserve – incorporated into the Coastal Protection Area<br><br>National Agricultural Reserve - incorporated into the Coastal Protection Area. | National Agricultural Reserve (inferred from the plan analysis, not explicitly mentioned in the plan) |

**LRCZCC 77/78**

The LRCZCC 77/78 was pioneering in its holistic approach to landscape integration, aligning with early European efforts to preserve coastal landscapes for both environmental and recreational purposes (Antrop, 2013; Olwig & Olwig, 2002). A significant innovation was that the plan considered all landscapes, not just outstanding coastal landscapes, reflecting a more inclusive approach aligned with the Convention (Council of Europe 2000, 2016). Key elements included:

- Natural Coastal Park (Figure 30): aimed to classify the entire intervention area as a Natural Coastal Park[36], integrating recreation, nature conservation, and rural development.

- Recreation Reserves (Figure 30): designated within a 200-meter coastal buffer, focusing on recreational and scenic functions while protecting ecological balance.

- Special Areas (Figure 31): Special Forest, Ecological, and Agricultural Areas were introduced to regulate urbanisation. These areas collectively covered most of the intervention area, significantly constraining urban development where construction was not permitted.

- Urban clusters (Figure 32): The 1 km clusters were designed to optimise access to essential infrastructure and services. They focused on settlements' access to utilities and transport while preserving urban form. In contrast, the 3 km clusters identified principal locations for primary service centres and guided urban expansion based on efficiency and sustainability. In our case studies, only 1 km clusters were identified, primarily in Póvoa de Varzim and Vila do Conde, as the study was not completed. Urban development was restricted within the 500-meter buffer zone from the high tide line and was only permitted beyond this limit.

Additionally, the study remained incomplete, leaving many proposed elements - such as pedestrian routes, historical roads, scenic viewpoints, and designated sites of monumental or picturesque value - unmapped. Subsequent plans did not address these specific concerns in their planning strategies. Moreover, had the LRCZCC 77/78 been implemented, the evolution of the coastal landscape would have been significantly different, as urban development would have been considerably constrained from 1978 onwards.

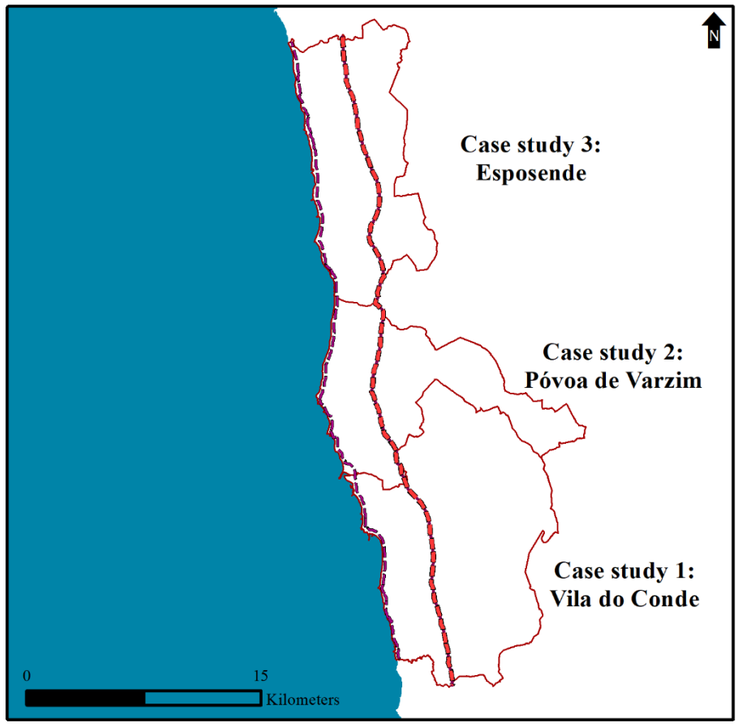



**Figure 30** Spatialisation of the integration of the Landscape in the LRCZCC 77/78 - Coastal Natural Park and Recreation Reserves

36 By this time a natural park was defined as an *"area of territory, properly organised, aimed at recreation, nature conservation, landscape protection, and promotion of rural populations, which may encompass both public and private property, where zoning establishes the capabilities and uses of different land parcels. The natural park may encompass one or more areas with the different types previously mentioned, which are integrated into a functional structure with specific regulations included in the overall regulation" (Decree-Law 613/76).*

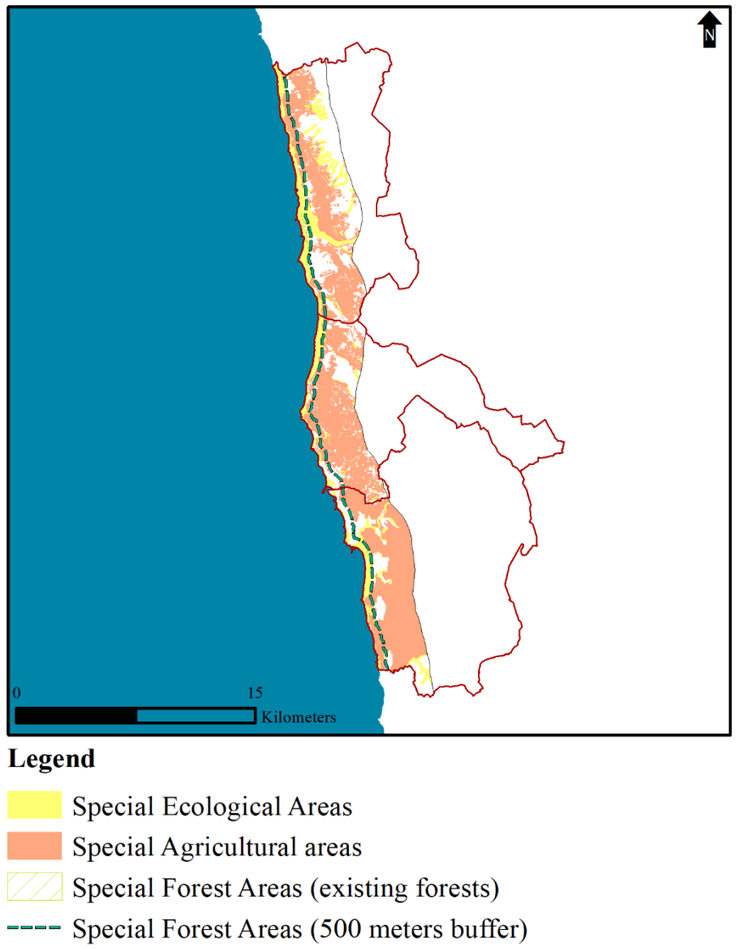



**Figure 31** Spatialisation of the integration of the Landscape in the LRCZCC 77/78 - Special Ecological, Agricultural and Forest Areas

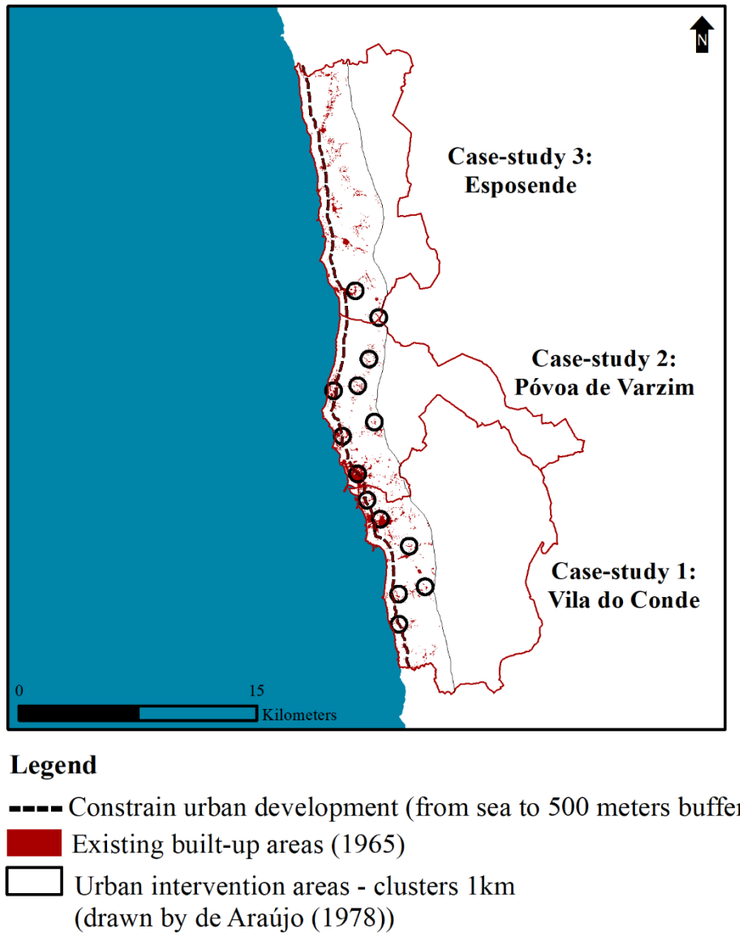



**Figure 32** Spatialisation of the integration of the Landscape in the LRCZCC 77/78 - Urban Clusters and buffer limiting urban development

**POOC-CE 1999**

The POOC-CE 1999 shifted toward a broader ecological and nature conservation perspective, emphasising:

- **Green Corridors**[37] (Figure 33): Proposed using the Public Maritime Domain[38] as a linear corridor for ecological connectivity and recreation, with waterlines serving as natural connections between the coastline and inland areas, though this was excluded from the final plan.

- **Protected Areas** (Figure 34): The POOC-CE 1999 included proposals for protected areas, such as the extension of the Protected Coastal Landscape of Esposende (established in 1987) and the re-establishment of the Mindelo Ornithological Park (initially created in 1957 in Vila do Conde, revoked in 1970, and reinstated in 2009). However, these proposals were ultimately excluded from the approved plan.

- **National Reserves** (Figure 35): Incorporated the National Ecological and Agricultural Reserves[39] into the Coastal Protection Area[40], enforcing strict land-use restrictions to safeguard ecologically and agriculturally significant areas.

Despite these efforts, urban development in significant areas occurred before the reserves were enforced, limiting their effectiveness. Also, the POOC-CE 1999 excluded the urban perimeters of the Municipal Director Plans from its intervention area. It designated the remaining area as critical for safeguarding the coast under the Coastal Protection Area category.

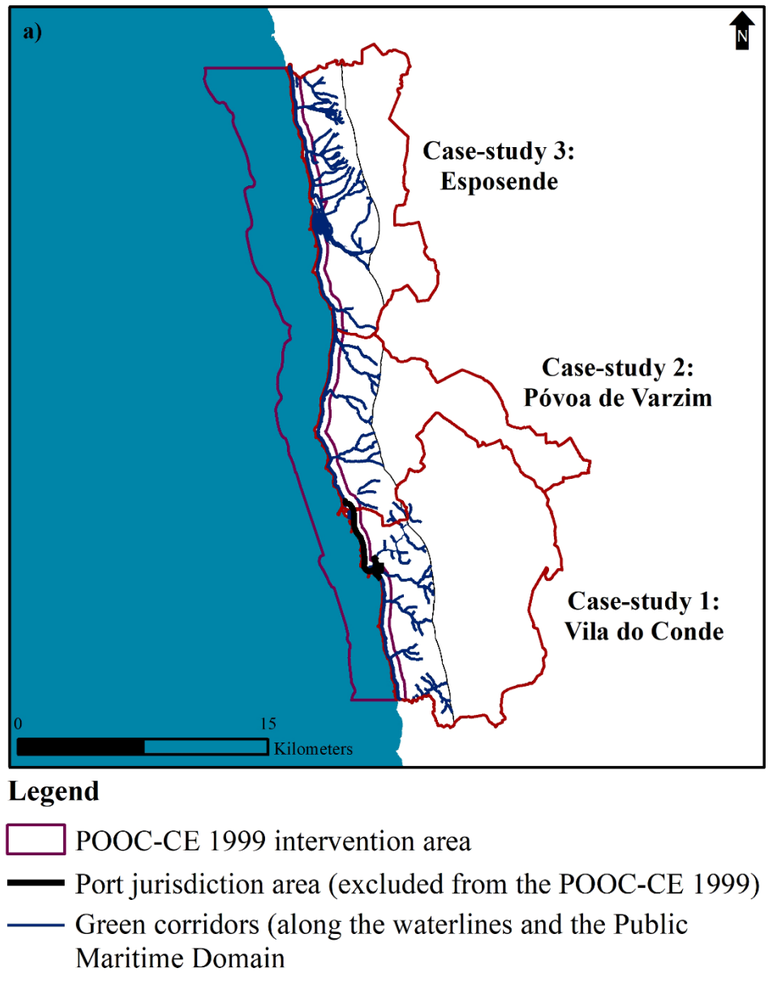



**Figure 33** Spatialisation of the integration of the Landscape in the POOC-CE 1999 – Green corridors

37 Green corridors are linear spaces, often vegetated, that serve recreational, ecological and cultural purposes. They also facilitate ecological connectivity, mitigate habitat fragmentation, and enhance ecological resilience (Jongman et al., 2004).

38 In Continental Portugal, the Public Maritime Domain refers to a public protection strip of 50 meters along the coastline extending 30 meters deep seaward.

39 Both reserves evolved from the concept of Special Ecological and Agricultural Reserves established in Decree-Law 613/76 (Andresen et al., 2005). The National Agricultural Reserve, created in 1982, was designed to protect soils best suited for producing essential agricultural goods needed for national supply, supporting agricultural development, and maintaining landscape balance and stability (Decree-Law n.º 451/82). The National Ecological Reserve, established in 1983 (Decree-Law n.º 321/83), aimed to identify and protect areas critical for the ecological stability of the territory and the sustainable use of natural resources, particularly the coastal and inland ecosystems. Both reserves prohibited urban development, facing municipal opposition, and the National Ecological Reserve's regulation was only formalised in 1990 (Decree-Law n.º 193/90) (Campos & Ferrão, 2018; Schmidt et al., 2013).

40 The Coastal Protection Area represents a protected portion of territory within the POOC intervention area, essential for coastal stability and the preservation of natural and cultural heritage. Within this category, land use is highly restricted and focused on ecological balance, with public investment aimed at enhancing its value and recreational potential (POOC-CE 1999).

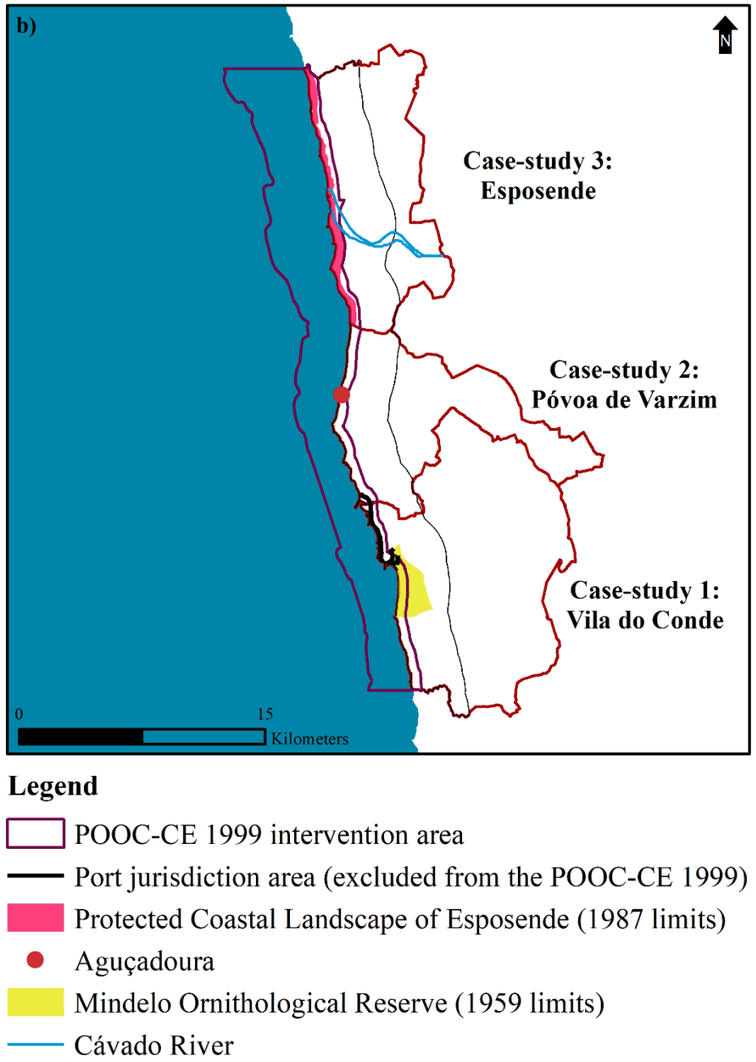



**Figure 34** Spatialisation of the integration of the Landscape in the POOC-CE 1999 – Protected Areas

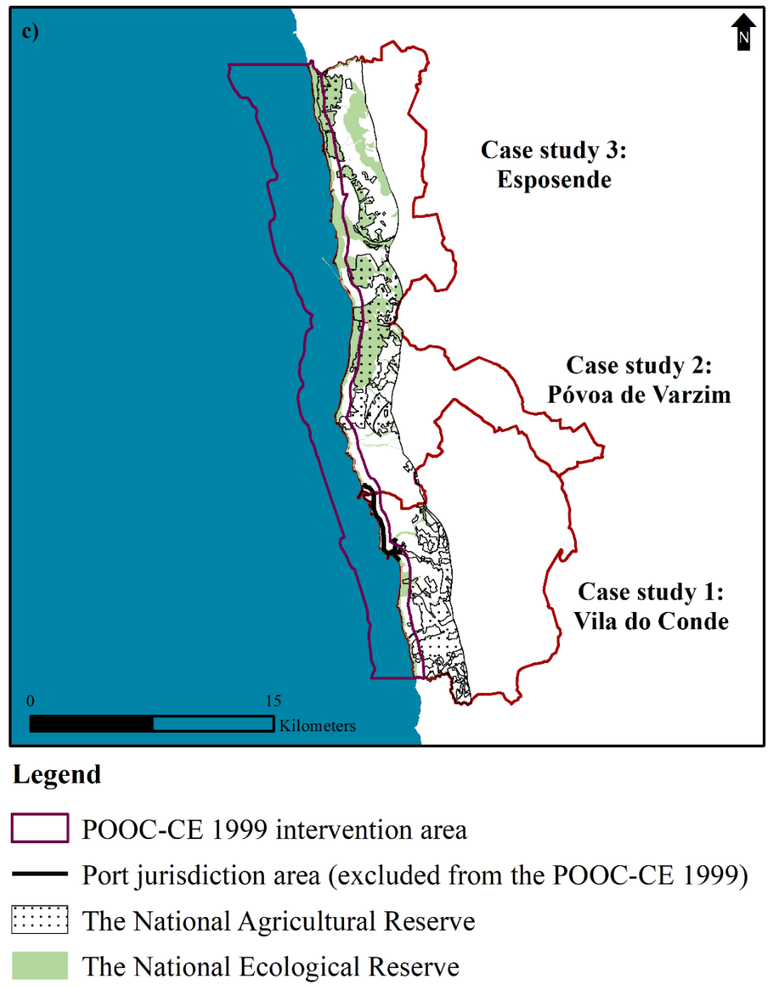



**Figure 35** Spatialisation of the integration of the Landscape in the POOC-CE 1999 – The National Agricultural and Ecological Reserve

**POC-CE 2021**

The POC-CE 2021 built on the POOC-CE 1999's strategies but introduced new elements:

- **Green Corridors** (Figure 36): Continued emphasis on green corridors along waterlines and areas within the National System of Classified Protected Areas.

- **Protected Areas and Natura 2000 Network** (Figure 37): Prioritised biodiversity conservation and ecosystem services, with a stronger focus on natural habitats of Natura 2000[41].

- **Coastal Protection Strips:** The former Coastal Protection Area was divided into the Coastal Protection Strip (focused on specific biotopes like dunes and estuaries) and the Complementary Protection Strip (a buffer zone for transition to urbanised areas). While the POC-CE 2021 implied the integration of the National Ecological and Agricultural Reserves (Figure 38), it did not explicitly mention them, reflecting a shift toward prioritising biodiversity and natural habitats. While urban areas remain excluded, like in the POOC-CE 1999, stricter protections are now limited to specific biotopes like dunes and estuaries, reducing the area to be subject to stricter protective measures. Although most of the areas of the Complementary Protection Strip remain protected under the National Agricultural Reserve, as they are included in the Municipal Director Plans, this shift marks a significant departure from the earlier approach, which applied stricter protection across the entire non-urbanised zone within the 500-meter buffer.

41 As the cartographic information of natural habitats was not available, they were not included in Figure 37.

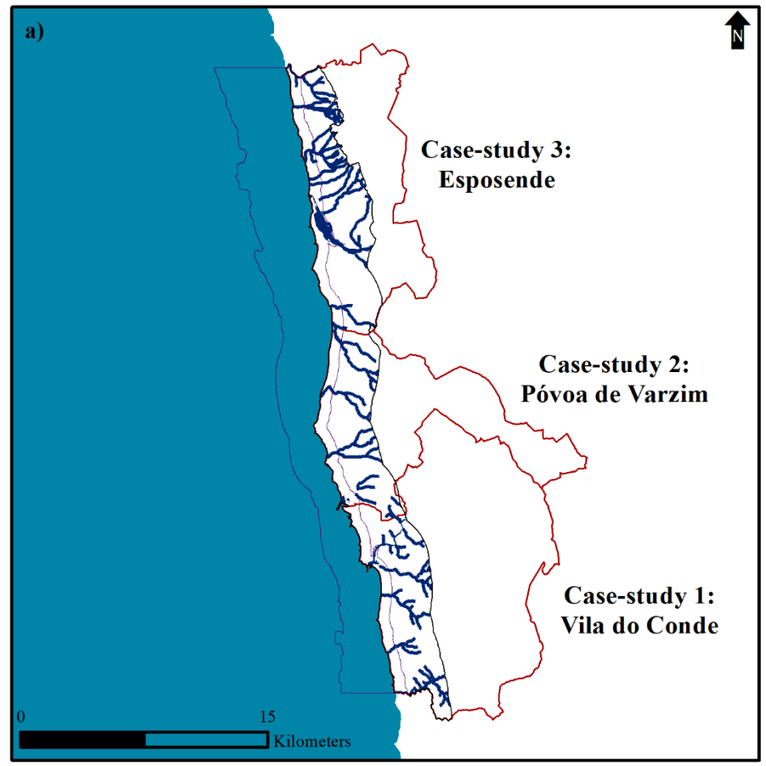



**Figure 36** Spatialisation of the integration of the Landscape in the POC-CE 2021 – Green Corridors

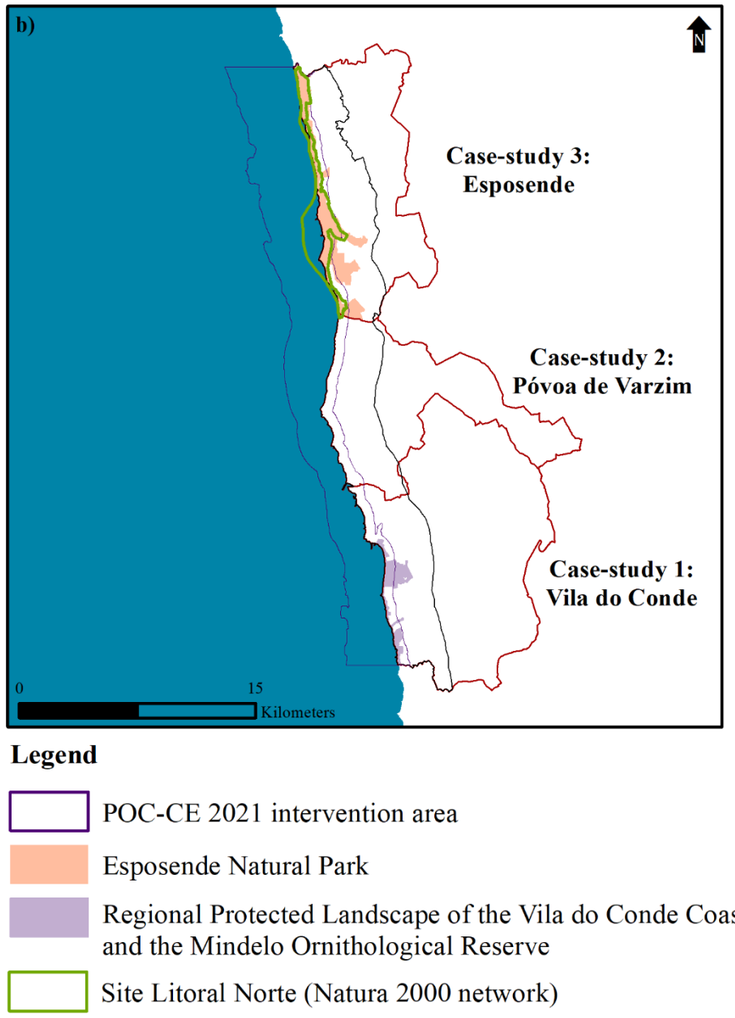



**Figure 37** Spatialisation of the integration of the Landscape in the POC-CE 2021 – Protected Areas and Natura 2000 network

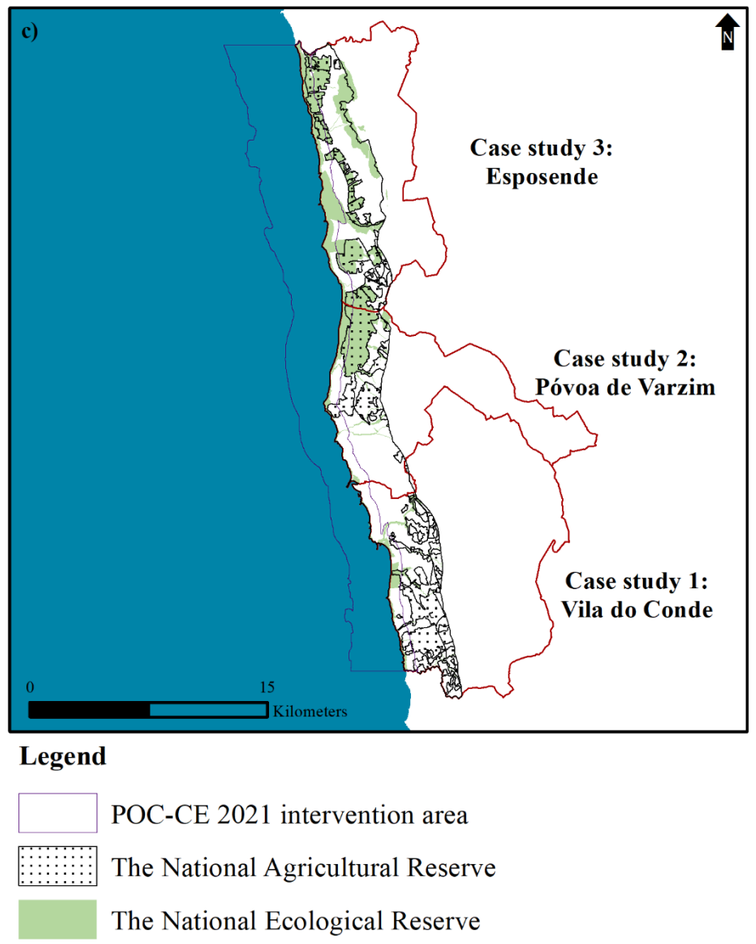



**Figure 38** Spatialisation of the integration of the Landscape in the POC-CE 2021 – The National Agricultural and Ecological Reserve

### 9.3.3. How have the conceptualisation and integration of landscape into the plans influenced the coastal landscape change?

The conceptualisation and integration of landscape in the LRCZCC 77/78, POOC-CE 1999, and POC-CE 2021 have significantly shaped their approaches to the coastal landscape, influencing both their strategic planning directions and the landscape's long-term evolution.

The evolution of principal mega classes since 1965 reveals a clear link to the timing of planning efforts (Figure 39). The absence of regional and municipal plans before 1995 enabled extensive urban expansion, with most artificialized surfaces emerging during this period. Most LULC changes occurred during the 30-year period between 1965 and 1995, primarily driven by urbanisation and infrastructure development, which took place in the absence of robust regulatory frameworks.

Had the LRCZCC 77/78 been implemented, it could have significantly altered the coastal landscape's trajectory, potentially mitigating many changes during that critical period. By 1995, much of the landscape had already been transformed. Between 1995 and 2007, LULC changes slowed due to the POOC-CE 1999 and Municipal Director Plans, followed by stabilisation from 2007 to 2018. As the cartographic analysis concludes in 2018, the impact of the POC-CE 2021 remains unassessed.

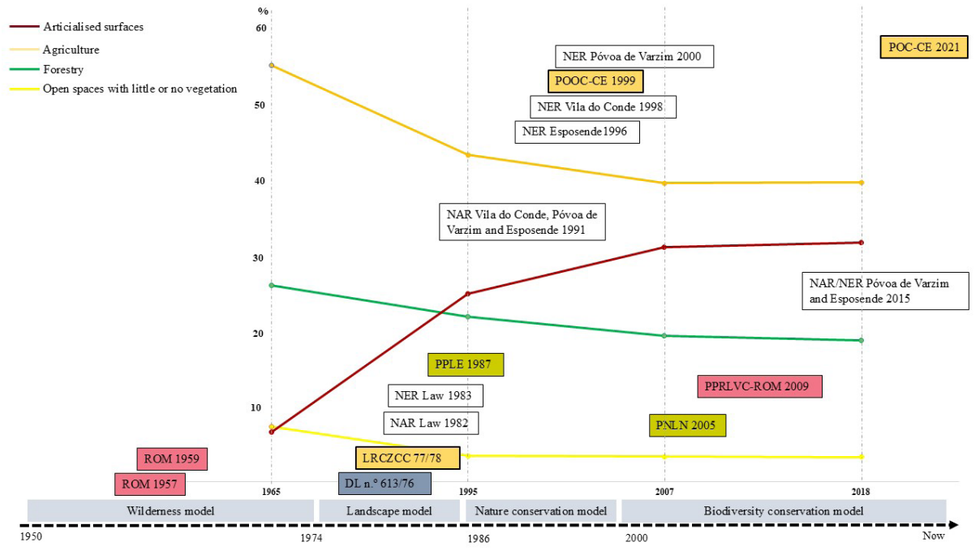



**Figure 39** Coupling of the institution's evolution and principal LULC mega classes change in the three case studies

A critical insight is the potential impact of the LRCZCC 77/78 had it been implemented in 1978. It proposed a 500-meter coastal buffer zone prohibiting urbanisation - an area that later became the intervention zone for the POOC-CE 1999 and the POC-CE 2021. However, none of the plans effectively used landscape units to define their intervention areas. Landscape units are crucial because they can recognise the boundaries of the coastal socio-ecological system, allowing for place-based approaches rather than relying solely on buffers or political-administrative boundaries. This shift would ensure that interventions were better tailored to the natural and cultural characteristics of the coastal landscape, promoting more sustainable and integrated planning. The LRCZCC 77/78 recognised their relevance despite also proposing a 3000-meter buffer. Still, it was significantly larger than the 500-meter buffers in later plans, limiting their ability to address socio-ecological dynamics, functions, and values.

The LRCZCC 77/78 also introduced and spatialised the concept of Special Ecological and Agricultural Areas. As shown in Figure 40 to Figure 42, urban development has been significantly constrained by the National Ecological and Agricultural Reserves, with most expansion occurring outside these zones. However, these frameworks only came into effect in the 1990s - thirteen years after Araújo's (1978) proposal. The National Agricultural Reserve (first generation) was enforced in 1991, while the more restrictive National Ecological Reserve (first generation) was implemented at different times: 1996 in Esposende, 1998 in Vila do Conde, and 2000 in Póvoa de Varzim (see Appendix 17 for more details). If the LRCZCC 77/78 had been implemented in the 1980s, much of the coastal landscape might have retained its natural and agricultural character, with urban development shifted beyond the 3000-meter buffer. Additionally, this would have significantly altered coastal erosion patterns and reduced the need for hard-engineering solutions in areas now at risk.

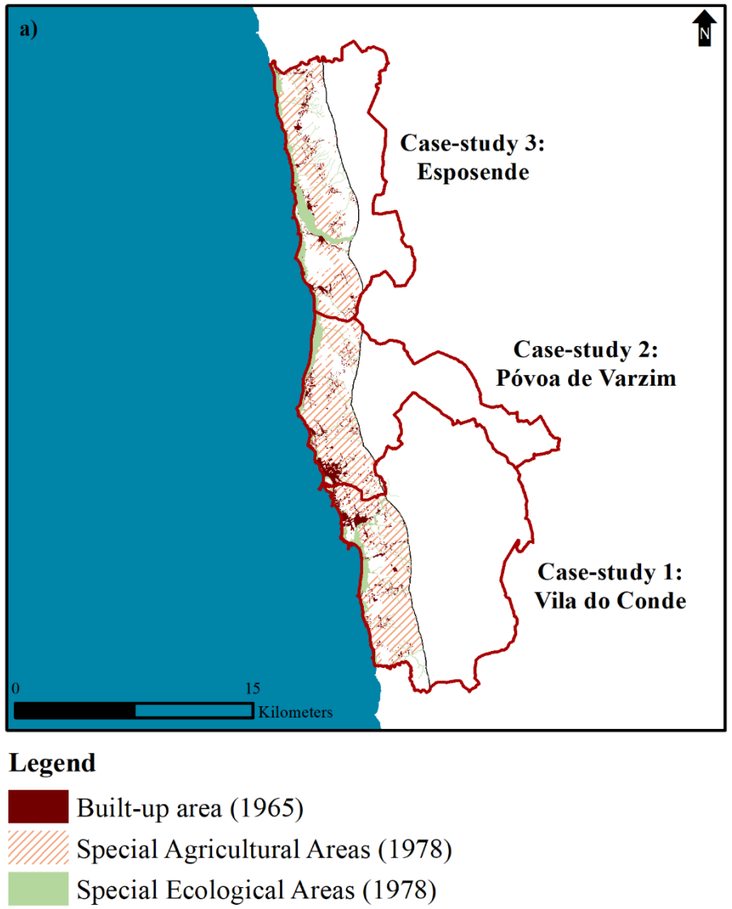



**Figure 40** Overlap of Built-up Areas (1965) with the Special Agricultural and Ecological Reserves



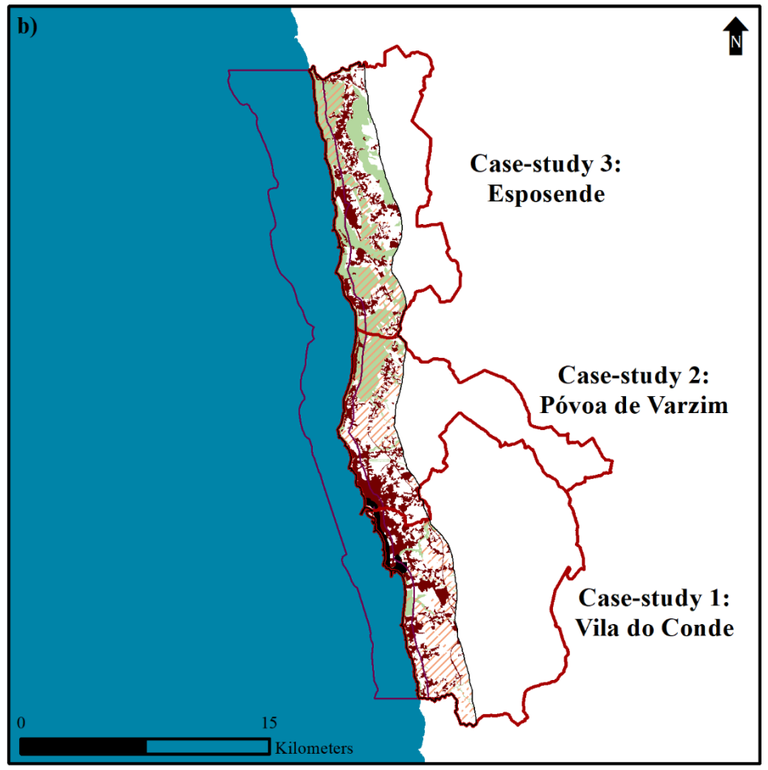



**Figure 41** Overlap of Built-up Areas (1995) with the National Agricultural and Ecological Reserves (1st generation)

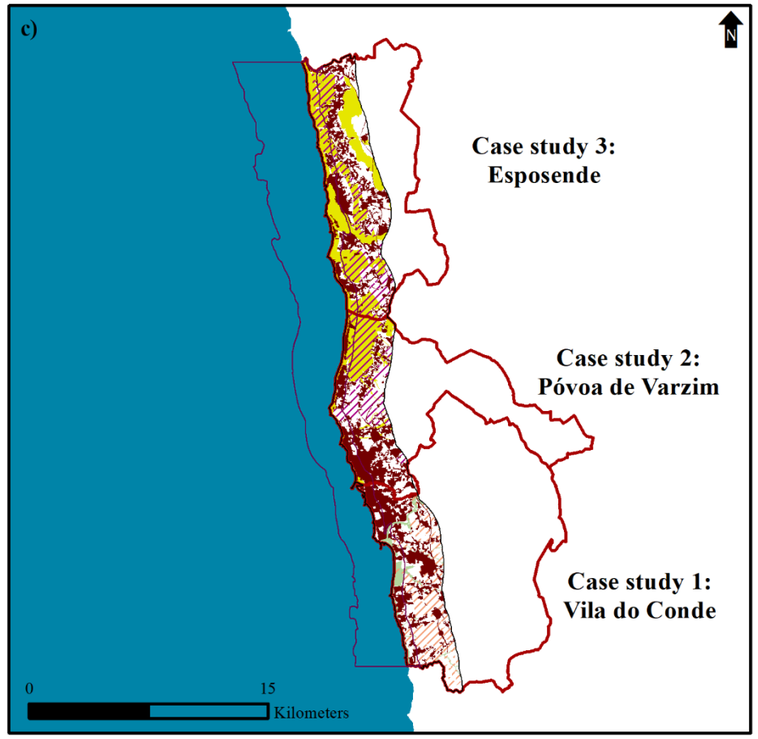



**Figure 42** Overlap of Built-up Areas (2018) with the National Agricultural and Ecological Reserves (1st and 2nd generation)

Another significant contribution of the LRCZCC 77/78 was its proposal to designate the entire area as a Natural Coastal Park, promoting nature conservation, sustainable recreation, and community development. This integrated approach could have significantly protected the coastal landscape. In contrast, existing protected areas today focus narrowly on safeguarding the dune system (Figure 43), falling short of Ilídio de Araújo's broader vision.



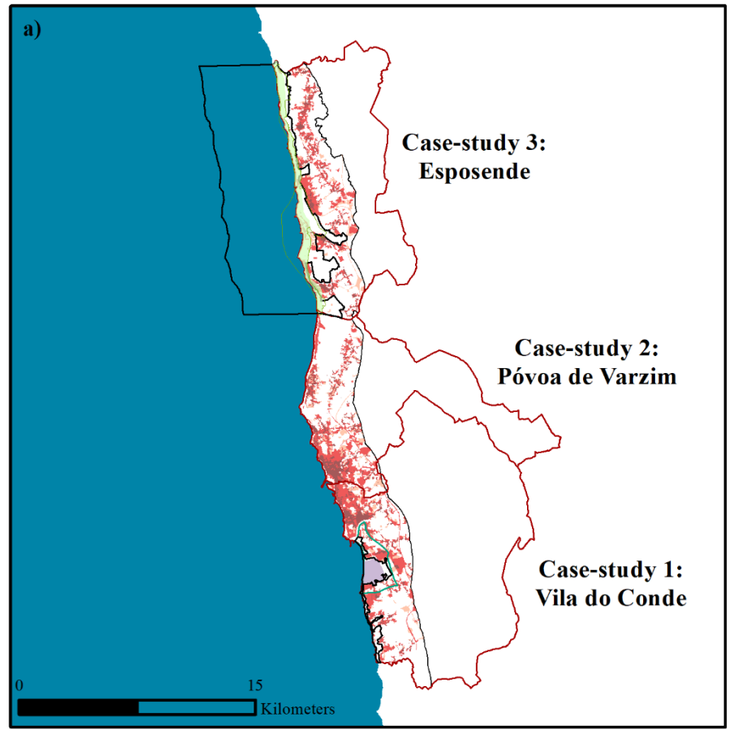



**Figure 43** Evolution of the boundaries of the Protected Areas in Vila do Conde and Esposende

All plans recognised the importance of soil protection but lacked specific measures to address agricultural intensification. While they aimed to safeguard agricultural areas from urban conversion, their approaches varied. The LRCZCC 77/78 proposed Special Agricultural Areas to preserve high-potential soils, but this was never implemented, leading to agricultural land reduction. The POOC-CE 1999 integrated the National Agricultural Reserve into the Coastal Protection Area, restricting urban development within a 500-meter buffer but failing to protect cultural landscapes like the masseiras from the rise of greenhouses. The POC-CE 2021 no longer includes specific categories for agricultural use; instead, it delegates that responsibility to the Municipal Director Plans, which saw their authority and responsibility significantly reinforced. None of the plans adequately addressed landscape simplification, such as the loss of edges and trees, despite its growing relevance in relation to agricultural intensification[42].

Regarding afforestation, the LRCZCC 77/78 aimed to protect and enhance forest areas within the 500-meter buffer but lacked detailed measures for vegetation changes. This trend continued in the POOC-CE 1999 and POC-CE 2021, which emphasised ecological connectivity and green corridors but failed to provide specific strategies for managing vegetation changes. While the plans acknowledged the importance of vegetation for ecological balance, they lacked actionable measures for effective monitoring and management.

42 Landscape simplification was not a problem when the LRCZCC 77/78 was developed.



## 9.4. Discussion

### 9.4.1. The influence of the conceptualisation and integration of landscape on LULC changes

This research set out to determine whether high levels of landscape integration have led to increased landscape protection in the Northern Region of Portugal, specifically in Vila do Conde, Póvoa de Varzim, and Esposende. By examining the conceptualisation and integration of landscape within coastal planning institutions and their corresponding LULC transformations from 1965 to 2018, we assessed their influence on long-term landscape changes.

Our findings reveal variations in the landscape conceptualisation used, the degree of landscape integration, and corresponding levels of protection across the three coastal instruments. An important insight is that a holistic conceptualisation of landscape does not necessarily correlate with a high level of integration within coastal instruments. Despite a conceptual evolution towards a comprehensive definition aligned with the Council of Europe Landscape Convention (Council of Europe, 2000, 2016), practical applications in the POC-CE 2021 have primarily focused on biodiversity conservation rather than embracing the full socio-ecological dynamics of coastal landscapes.

The LRCZCC 77/78, developed in the late 1970s, displayed the highest level of landscape integration, proposing a holistic framework that incorporated ecological, cultural, aesthetic, and socio-economic dimensions. Had it been implemented, this study could have significantly influenced the coastal region's urban development patterns, controling urban sprawl and fostering more sustainable land-use strategies. However, more recent plans, such as the POOC-CE 1999 and the POC-CE 2021, adopted a narrower conservation-oriented approach, primarily linking landscape protection to nature-protected areas rather than a broader socio-ecological perspective. This shift has had tangible effects on LULC transitions, particularly in limiting the potential for multifunctional LULC and integrated coastal landscape governance. Prioritising landscape sustainability science (Wu, 2012; Wu, 2021), especially landscape governance (Görg, 2007; Van Oosten et al., 2018), within coastal governance frameworks supports more holistic, systemic and place-based strategies. This approach supports effective governance and a deeper understanding of the social-environmental interdependencies (Reyers & Selig, 2020), reinforcing the call by Gonçalves and Pinho (2024b) for a paradigm shift towards coastal landscape governance.

However, more empirical evidence is needed to support this call, emphasising the urgency for research on the evolving conceptualisation and integration of landscape within coastal institutions. Such research is essential to shift policies away from treating the coastal landscape merely as scenery, where beauty is the primary focus (Williams et al., 2023), and toward a more comprehensive approach. While aesthetic value remains essential, it is crucial to recognise and incorporate the landscape's dynamic nature, diverse values, and the multiple narratives that shape it. These narratives significantly influence management strategies and climate adaptation options, as demonstrated by Köpsel et al. (2017).

#### *9.4.1.1. Limitations of landscape integration in coastal planning institutions*

Despite the increasing inclusion of the concept of landscape in coastal institutions today, its integration remains limited in several ways:

1. **Lack of landscape units:** Plans rely on legally defined buffer zones (e.g., 500 meters from the high-tide line) instead of recognising socio-ecological boundaries, limiting the potential for place-based planning.

2. **Sectoral fragmentation:** Planning instruments have focused on biodiversity conservation within protected areas, leading to an institutional disconnect between conservation efforts and broader socio-economic and cultural dynamics.

3. **Persistence of the 'Outstanding Landscape' narrative:** Despite policy advancements, coastal institutions still perceive landscapes primarily as aesthetic or exceptional areas rather than as integrated socio-ecological systems. This perception limits the application of landscape governance principles, restricting more inclusive and adaptive planning approaches.

4. **Reactive rather than proactive measures:** Regulatory frameworks primarily respond to development pressures rather than proactively shaping land-use trajectories. The delayed implementation of instruments such as the National Ecological and Agricultural Reserves, as well as the slow classification of key protected areas (e.g., Mindelo Ornithological Reserve), exemplifies this challenge.

5. **Exclusion of cultural, perceptual and aesthetic landscape values:** While aesthetic and cultural aspects of the landscape were recognised in early studies like the LRCZCC 77/78, later plans primarily focused on ecological values. This has led to the marginalisation of traditional agricultural systems and the neglect of landscape heritage elements. Cultural, perceptual, and aesthetic values are fundamental components of a holistic understanding of the coastal landscape. The exclusion of these dimensions in later coastal plans limits the ability to fully capture the multi-layered identity of the coastal landscape, which includes not only its ecological functions but also its historical significance, community relationships, and visual characteristics. By marginalising traditional agricultural systems and neglecting landscape heritage elements, planning institutions risk erasing cultural identity, diminishing local knowledge systems, and overlooking the role of landscapes in shaping community well-being. Additionally, perceptual values, such as how people experience and emotionally connect with a place, play a crucial role in fostering local stewardship and engagement in landscape conservation and enhancement.

#### *9.4.1.2. Influence of landscape science on coastal institutions*

One notable result is that landscape science had a more substantial influence on the LRCZCC 77/78, a plan developed nearly fifty years ago, than on more recent plans. This plan proposed the highest level of landscape integration by adopting a holistic approach to both the conceptualisation and integration of the landscape. Despite this, as Gonçalves and Pinho (2025) demonstrated, there was still room for improvement. Several aspects, such as adopting system-level resilience, fostering adaptive planning, assessing driving forces, engaging multiple stakeholders, and establishing a comprehensive landscape-monitoring system, were not entirely relevant or addressed when the study was conducted.

In contrast, more recent plans, like the POOC-CE 1999 and POC-CE 2021, also did not incorporate many of these elements, despite the advancements in landscape science. As a result, these newer plans are less aligned with the current landscape science discourse and do not reflect the conclusions of Hersperger et al. (2020), who emphasised the significant contributions of landscape science to strategic planning in many European regions. A

valuable direction for further research could involve a comparative analysis of landscape integration in European coastal planning institutions over time. This study could examine how and why certain advancements in landscape science, as highlighted by Hersperger et al. (2020), were either incorporated or overlooked in coastal institutions. Such research could analyse factors that influence the adoption (or lack) of landscape science principles in coastal policy, considering variables like institutional priorities, political agendas, formal and informal actors' involvement, and socioeconomic pressures, such as the influence of European Union funding schemes.

#### *9.4.1.3. The gap between science, policy and planning*

Our findings highlight a gap between landscape science discussions, policy design and implementation, and planning practice in Portugal. Despite Portugal's commitment to the Council of Europe Landscape Convention (2000, 2016), its principles are not fully reflected in governance frameworks. Unlike Mediterranean counterparts such as Italy and Spain (Albrechts et al., 2020; De Montis, 2016; Nogué & Sala, 2018), where landscape planning aligns more closely with the Convention, Portugal has delayed full integration. This delay can be attributed to sectoral fragmentation, a lack of institutional coordination, and the persistence of traditional planning approaches that prioritise biodiversity conservation over holistic landscape governance. Additionally, short-term political cycles, a focus on political gains, limited territorial and landscape literacy, and siloed departmental structures have further hindered full integration. Additionally, the narratives and perceptions of decision-makers responsible for coastal planning play a crucial role in shaping governance outcomes, and these factors require further investigation (Köpsel et al., 2017).

#### *9.4.1.4. The underlying influence of the European Union*

Portugal's coastal governance has evolved through various models, from a wilderness-focused approach (1971-1974) to landscape-based (1975-early 1980s), then nature conservation (mid-1980s to late 1990s), and finally a biodiversity model, each shaped by Europeanisation following European Economic Community (now the European Union) accession in 1986 (Gonçalves & Pinho, 2024a; Pinto & Partidário, 2012). Europeanisation, the process by which European Union standards influence national policies (Clark & Jones, 2009), has had a more significant impact than the Council of Europe Landscape Convention (Council of Europe, 2000, 2016).

This highlights the need for the European Union to integrate landscape thinking at a higher level, aligning regulations with the Convention (Shuttleworth, 2017). A unified European Union regulatory framework could support landscape governance and integrated landscape approaches (Görg, 2007; Reed et al., 2023), moving beyond fragmented policies that have hindered effective coastal zone management (Alves et al., 2013; Portman et al., 2012). Prioritising landscape governance (Bürgi et al., 2017a) would bridge research, policy, and practice, fostering interdisciplinary collaboration and context-specific policies that balance conservation and development objectives (Reed et al., 2023).

#### *9.4.1.5. The essential role of the National Ecological and Agricultural Reserves*

The need to reconcile conservation with development was a central goal of the LRCZCC 77/78, which emphasised the coastal landscape as both a common and public good. The plan aimed to safeguard its most significant values while acknowledging it as an area of high economic interest, proposing its classification as a Natural Park. Adopting a forward-looking approach to landscape integration, it advocated for broader protective zones that, if fully implemented, could have mitigated urban sprawl and protected the coastal landscape. The plan also attempted to establish Special Agricultural and Ecological Reserves, which later evolved into the National Agricultural and Ecological Reserves, prioritising public interest over private land occupation rights to protect fundamental areas for territorial and environmental sustainability. Had it been finalised or implemented, it would likely have been a game changer in the evolution of the Northern Region of Portugal's coastal landscape.

However, the delayed implementation of regulatory frameworks has significantly impacted the evolution of the coastal landscape. For example, the enforcement of the National Ecological Reserve only occurred in the 1990s due to opposition from several municipalities. A similar delay occurred with the Mindelo Ornithological Reserve, which was formally classified only in 2009. Additionally, the Esposende protected area underwent a gradual shift in

regulatory status, transitioning from a Landscape Protected Area to a Natural Park. These delays underscore the challenges of translating planning goals into enforceable frameworks and reveal a pattern of protracted timelines that have limited the effectiveness of conservation initiatives to protect the coastal landscape.

Despite their relevance for containing urban development, the primary instruments for landscape planning in place today in Portugal remain the National Agricultural and Ecological Reserves, along with greenway and green infrastructure proposals mandated at regional and municipal levels. However, in many cases, their potential is underutilised (Andresen et al., 2005), as these green infrastructure proposals often lack a cohesive, underlying strategy and merely juxtapose existing reserves without integrated planning or vision. A shared long-term landscape vision has significant impacts on addressing planning challenges, extending beyond short-term concerns (Voskamp et al., 2023). This highlights the need for further research to enhance the strategic use of these instruments in sustainable coastal landscape planning and to explore how the landscape services (Van der Sluis et al., 2019; Westerink et al., 2017) they provide can be economically valued. Demonstrating this value could reduce opposition from those who still view these reserves as obstacles to urban development and also serve as a foundation to rethink innovate landscape management practices.

#### *9.4.1.6. The lack of management plans and their implications for the coastal landscape*

In Portugal, the planning system primarily emphasises planning instruments, overlooking the importance of management plans. This focus has contributed to significant gaps in addressing, for example, shifts in vegetation types and forest cover. For instance, while our case studies reveal a significant shift from native forests to non-native eucalyptus plantations, none of the coastal plans directly tackled these changes. This trend reflects a broader regional shift in the Northern and Central Regions of Portugal, where the forestry sector has transitioned from meeting local agrarian needs to supplying global industrial wood markets (Oliveira et al., 2017). The LRCZCC 77/78 was ambitious in aiming to protect forest areas within a coastal buffer; however, the more recent POOC-CE 1999 and POC-CE 2021 centred on ecological connectivity through green corridors without concrete strategies for managing vegetation types, aside from invasive species eradication. This oversight reflects a broader limitation in Portugal's planning system, where the emphasis on planning tools lacks the follow-through of targeted management strategies necessary to respond to the dynamism of all landscapes.

This pattern also aligns with our observations on the simplification of coastal landscape patterns within our case studies, where we noted fewer property boundaries, hedgerows, and trees, although this was not quantified. The shift towards monocultures, particularly through intensive agriculture and the expansion of eucalyptus plantations, has altered the authenticity of the coastal landscape, leading to greater homogenisation. This decline in traditional agricultural practices, coupled with intensification, mirrors broader socio-economic trends observed across various European countries.

However, the nature of intensification in our case studies differs from regions such as Central Europe, where it often involves heavy mechanisation and advanced technology (Felix et al., 2022; Plieninger et al., 2016). In our case studies, intensification has been driven less by large-scale mechanisation and more by specific crop production, supported by the Common Agricultural Policy incentives, with technological investment primarily focused on greenhouse cultivation. For instance, while plastic-covered greenhouses offer controlled growing conditions and extended harvest periods, the intensification observed in Póvoa de Varzim contrasts with the Central European model, which is typically characterised by large-scale mechanisation and high-tech agricultural systems.

These European regional variations highlight the need for nuanced policies that support sustainable agricultural practices while balancing the preservation of traditional systems against evolving socio-economic pressures. Similar to other European regions, the loss of traditional agricultural systems, driven by the Common Agricultural Policy, has often led to landscape homogenisation, reduced landscape multifunctionality, loss of ecosystem services, and declining landscape quality (Cuadros-Casanova et al., 2023; Lefebvre et al., 2012). This pattern is evident in our case studies, where coastal institutions did not include specific measures for increasing landscape compartmentalisation, a factor that could mitigate these homogenising effects. This gap also relates to the previously mentioned lack of management plans that could operationalise the planning options, translating broader planning goals into practical, actionable steps to preserve landscape diversity and authenticity.

#### *9.4.1.7. The need for rethinking coastal institutions*

Urbanisation between 1965 and 1995 significantly transformed the coastal landscapes in our case studies. Before the introduction of Municipal Director Plans and POOC-CE 1999, unregulated expansion altered these areas, particularly in Vila do Conde and Póvoa de Varzim. These patterns mirror trends observed in other Portuguese coastal areas (Faria de Deus & Tenedório, 2021; Freire et al., 2009; Freitas & Dias, 2019) and globally (Chiodelli et al., 2021; Malavasi et al., 2013; Segrell & Lundqvist, 1993; Wang et al., 2024; Williams et al., 2022), emphasising the urgent need for integrated governance frameworks (Cicin-Sain & Knecht, 1993; Frazão-Santos et al., 2021; Pittman & Armitage, 2016).

Our findings highlight the limitations of coastal governance approaches that rely on policy-defined boundaries. Currently, in Portugal, landscape units are identified at the regional level but primarily for assessment rather than governance purposes. This approach contrasts with Araújo's (1978) vision, which advocated for socio-ecological boundaries to define coastal landscapes. Although Araújo (1978) used buffer limits, the author recognised the need for precise boundaries, a principle overlooked in both POOC-CE 1999 and POC-CE 2021, which rely on legally fixed buffer zones rather than dynamic socio-ecological delineations (Schlüter et al., 2020). Further research is needed to clarify and define what constitutes a coastal landscape within the specific context of the Northern Region of Portugal.

Moreover, it's important to note that the challenges in implementing integrated governance frameworks should not be seen as a failure of the concept itself. As this research shows, incomplete implementation often reflects the complexities of governance systems, specifically, the broader socio-ecological dynamics and power structures within which these policies operate. Achieving the integration of socio-ecological boundaries requires exploring new governance pathways that address these complexities, including power structures, knowledge co-production, stakeholder inclusion, institutional reconfiguration, and innovative financing and monitoring mechanisms (Beunen et al., 2015; Van Assche et al., 2014). Such a transformative agenda should also align with the degrowth literature (Parrique, 2023; Savini et al., 2022) as the current global economic model, which continuously prioritises economic growth, fails to address socio-ecological needs among global social and environmental challenges.



Our research also shows that LRCZCC 77/78 was the only study with a comprehensive, forward-looking urban development vision, even before the introduction of the Municipal Director Plans in 1982 (Decree-Law no. 208/82). Prior to this, urban development plans focused only on urban areas and adjacent green belts, often overlooking broader territorial and environmental concerns (Campos & Ferrão, 2018; Pinho, 1985). In contrast, the POOC-CE 1999 took a reactive approach, incorporating Municipal Director Plans' urban perimeters without a broader strategy, while the POC-CE 2021 focused on artificialized areas that also mainly aligned with defined urban perimeters. This reactive approach in both POOC-CE 1999 and POC-CE 2021 missed opportunities to critically assess or reshape urban development patterns, inadequately addressing the socio-ecological dynamics of the coastal region.

These patterns reflect a broader trend toward decentralisation in coastal governance (Gonçalves & Pinho, 2022; Siry, 2006), where greater municipal control over land use may introduce fragmentation, limiting integrated planning. However, decentralisation also aligns with post growth principles by empowering local communities to address social and environmental needs independently of centralised growth demands (Parrique, 2023). Some scholars argue that decentralised governance fosters community involvement and responsiveness to local needs (de Oliveira et al., 2024; Mojica-Vélez et al., 2018), while others advocate a unified, landscape-based approach (McHarg, 1969; Nijhuis et al., 2020) that operates at a regional scale (Cabana et al., 2023), and centres local communities within coastal governance (Schlüter et al., 2020).

Further research should explore pathways to empower local communities through decentralised frameworks at a regional scale and integrate transformative agendas that align with sustainability and post growth principles. By embracing these dimensions, coastal landscape governance, hopefully, can evolve toward more resilient and adaptable institutions capable of addressing the societal challenges that are already upon us.

#### *9.4.1.8. The role of design and landscape architecture in coastal governance*

This research reinforces the argument of Gonçalves and Pinho (2024b) that coastal landscape governance should incorporate regional design as a crucial

framework for managing the complexities of coastal landscapes. Coastal governance operates across various scales, ranging from the global to the local scale. However, studies have shown that governance efforts often focus predominantly on the local level, with increasing advocacy for strengthening regional-scale approaches (Cabana et al., 2023). The regional scale serves as a critical intermediary, bridging local initiatives with broader national and global impacts (Neuman & Zonneveld, 2018), aligning with the call for place-based research on landscape governance at regional levels (Wu, 2013). Moreover, adaptive landscape design and planning, through an experimental "learn-by-doing" approach, can be integrated at the regional level to enhance governance by fostering iterative evaluations, incorporating short-term process indicators, and making lessons more generalisable, thereby improving resilience and effectiveness in managing coastal landscapes in the face of changing climate, social demands, and uncertain futures (Qiu et al., 2025).

This study reinforces the argument that landscape architecture, beyond beautification or mere preservation, can provide powerful tools for harmonising LULC (old and new) while envisioning ecological, cultural, and socio-spatial relationships. The LRCZCC 77/78, developed by a landscape architect, exemplifies how design thinking can contribute to planning frameworks that integrate multiple dimensions of the landscape. A landscape-based regional design strategy does not necessarily require comprehensive design plans for every locale but instead advocates for a design perspective throughout governance processes. This approach allows for discerning how activities can be combined or separated, identifying fragile relationships, and ensuring that targeted interventions address multiple challenges simultaneously (Nijhuis et al., 2020).

By incorporating landscape design principles into governance, planning institutions can better balance development pressures with long-term landscape sustainability, fostering more adaptive and resilient coastal landscapes. Moreover, a regional design perspective enables the articulation of cross-scale connections and facilitates integrated solutions that reconcile environmental, economic, cultural, and aesthetic objectives.



#### *9.4.1.9. Towards inter and transdisciplinary approaches in Coastal Landscape Governance*

Finally, our research underscores that coastal instruments, mainly the POOC-CE 1999 and POC-CE 2021, have overlooked the broader role of coastal landscapes as social, cultural, and aesthetic spaces, failing to preserve areas of cultural significance, traditional land-use practices and unique aesthetic values. This finding aligns with the conclusions of Zhou et al. (2019), who observed that landscape sustainability science has primarily focused on ecological and practical dimensions over sociocultural and theoretical aspects.

This trend highlights the need for deeper bridges between the natural and social sciences, embracing not only the dominant positivist ontology in landscape science but also perspectives from constructivism, critical theory, and critical realism, among others. A truly inter and transdisciplinary approach, integrating diverse academic perspectives while collaborating closely with stakeholders, is essential for developing co-produced solutions that capture the full complexity of coastal landscape governance.

### 9.4.2. Research Limitations

This research, while comprehensive in its analysis of the landscape changes and the conceptualisation and integration of landscape in coastal institutions in Northern Portugal, faces, nonetheless, some limitations.

First, as previously mentioned, due to limited time and resources, the study relied on predefined boundaries of the system to be governed by existing coastal institutions. These boundaries, restricted by buffer limits, fail to fully account for socio-ecological dynamics, land-sea interactions, and the seascape, limiting a comprehensive understanding of the coastal landscape. Future research should explore the development and use of adaptive boundary frameworks to provide a more comprehensive understanding and integration of the coastal landscape in the governance system.

Second, while LULC changes provide a valuable snapshot of landscape change, they overlook other critical factors, such as ecological processes, social dynamics, and cultural values that also shape landscapes. Future research should assess aesthetic, cultural, and economic values, as well as community perceptions, to gain a deeper understanding of the tangible and intangible

dimensions that shape the coastal landscape.

Thirdly, although LULC changes were well-documented, the study does not delve deeply into the driving forces behind these changes. Factors such as population growth, economic development, and shifts in agricultural policies (e.g., EU incentives) are acknowledged but not thoroughly explored, as this was beyond the scope of the research. Future research on driving forces affecting the Portuguese coastal landscape is fundamental. As stated by Imbrechts et al. (2024, p. 2), very few studies have investigated the driving forces behind landscape changes in Portugal.

Fourth, the analysis of LULC changes was constrained by the availability of cartographic data. For example, during the period 1965-1995, it would have been helpful to include an intermediate year better to capture the dynamics within this highly transformative 30-year period. Furthermore, the analysis only covers LULC changes up to 2018, limiting the ability to assess the more recent impacts of the POC-CE 2021 programme. The long-term effectiveness of this programme remains uncertain, requiring future studies to evaluate its influence on coastal landscape dynamics.

Finally, the LRCZCC 77/78 was never completed and implemented. Our research could only hypothesise about the potential impacts of the LRCZCC 77/78. This gap limits the ability to compare its real effects with the later institutions that were put into practice. Nonetheless, the deduced evidence, based on reliable data, highlights the possible effects it might have had if it had been implemented.

## 9.5. Concluding Remarks: Towards Coastal Landscape Governance[43]

For decades, the governance of the coastal region has been a topic of political and scientific discussions. In parallel, discussions surrounding coastal landscapes have primarily focused on their scenic and ecological qualities. Since the adoption of the Council of Europe Landscape Convention, landscape science and the planning systems of several European countries have been strongly influenced by its principles. Internationally, the introduction of

43 This section was originally titled "Conclusions: Towards Coastal Landscape Governance" in the source material.



landscape governance, an evolved form of environmental governance aimed at reconnecting the politics of scale with the inherent characteristics of place, has opened new avenues for discussion. However, landscape governance has yet to make a significant contribution to the coastal governance debate.

Our research addresses this gap by investigating whether high levels of landscape integration lead to increased landscape protection. To do so, we assessed how the conceptualisation and integration of landscapes within three regional coastal instruments (the LRCZCC 77/78, the POOC-CE 1999, and the POC-CE 2021) have influenced coastal landscape changes from 1965 to 2018 in Northern Portugal, focusing on three case studies: Vila do Conde, Póvoa de Varzim, and Esposende. Our findings reveal that while landscape considerations have gained prominence in planning instruments over time, their integration remains inconsistent. A critical insight is that a holistic conceptualisation of landscape does not necessarily translate into effective integration within planning frameworks. Despite the evolution of landscape definitions aligned with the Council of Europe Landscape Convention, practical applications, particularly in the POC-CE 2021, have been limited to biodiversity conservation, neglecting broader socio-ecological dimensions.

Surprisingly, the LRCZCC 77/78 study, developed nearly fifty years ago by the landscape architect Ilídio de Araújo, aligns more closely with current discussions in landscape science. This finding highlights the critical role that landscape architecture can play in shaping governance frameworks, not only through physical design but by offering integrative solutions that reconcile ecological, social, cultural, economic, aesthetic, and perceptual dimensions. Landscape architects can help bridge sectoral gaps, ensuring that planning and design instruments move beyond conservation-centric approaches to embrace multifunctional and adaptive landscape strategies, fostering sustainable development through integrated, place-based approaches.

Our research highlights several systemic challenges that have constrained landscape integration in coastal planning institutions. These include reliance on legally defined buffer zones rather than socio-ecological boundaries, sectoral fragmentation that isolates biodiversity conservation from broader socio-economic considerations, and reactive rather than proactive regulatory measures. Additionally, the exclusion of cultural, perceptual, and aesthetic landscape values has marginalised cultural agricultural systems and landscape heritage elements, reducing local engagement and stewardship.

Another key finding is the declining influence of landscape science on coastal planning. While the LRCZCC 77/78 incorporated key principles of landscape planning and design, more recent instruments, such as the POOC-CE 1999 and POC-CE 2021, have failed to integrate advances in landscape science, such as resilience-based planning, adaptive strategies, and multi-stakeholder engagement.

The gap between scientific research, policy design and implementation, and planning practice remains a persistent challenge, limiting the effectiveness of coastal landscape governance. While institutions claim a holistic conceptualisation of landscape, practical integration often falls short, tending instead to focus on dominant narratives of nature conservation (POOC-CE 1999) and biodiversity conservation (POC-CE 2021), both heavily influenced by European Union policies. By providing empirical evidence on how coastal planning institutions have evolved and incorporated the concept of landscape, this paper demonstrates how different underlying narratives have shaped the interpretation of coastal landscapes and the measures implemented.

Our research, while limited to the Portuguese context, emphasises the need for coastal landscape governance at the European level. Portugal's evolutionary pathway illustrates how prioritising landscape within coastal governance has proven essential for higher levels of coastal protection. The strong influence of European Union environmental policies on Portuguese coastal governance reinforces the need for a more integrated European regulatory framework that aligns with the Council of Europe Landscape Convention (2000, 2016) and promotes a landscape-based governance model.

Finally, we argue that advancing coastal landscape governance requires political will to embrace risks and foster a radical, transformative shift in how the governance system is conceptualised and approached. Coastal institutions must integrate socio-ecological boundaries, embrace sustainability and post-growth principles, and move beyond reactive planning. A truly inter- and transdisciplinary approach, integrating both social and natural sciences while actively engaging stakeholders, is essential for fostering resilient coastal landscape governance.

This argument aligns with the broader idea that the problem is not just with institutions (policies, plans, or laws) but with the entire governance system and its relationship with the system to be governed, which in this context is the coastal landscape. Incomplete implementation does not necessarily indicate flawed plans or an ineffective approach to integrating preservation and development through landscape-based strategies. Instead, it highlights the need for a holistic approach that acknowledges the interdependencies within the governance system, its power dynamics, and its adaptive, co-evolutionary, and context-dependent characteristics. Only through such a comprehensive and inclusive approach can visionary ideas, like those of Ilídio de Araújo, be translated into sustainable, tangible outcomes, ensuring the resilience and future of our coastal landscapes.

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# 10 Research findings and conclusions

## 10.1 Main findings

We now turn to summarising the main findings that address the research questions posed at the beginning of this thesis. As presented in Section 4, these questions are: (1) How has the conceptualisation and integration of landscape within Portuguese coastal planning institutions evolved, particularly across national and regional scales? and (2) How has this evolution influenced coastal landscape change at the municipal level up to the present?

The findings of this investigation, structured and interpreted through the lens of Evolutionary Governance Theory, are presented below. To maintain focus and avoid redundancy, only the most significant findings directly addressing these research questions are highlighted here. More detailed discussions on specific aspects are provided in the respective sections of the research articles.

Considering that both research questions are closely interrelated and discussing one inevitably ties into the other, the main findings are now organised into ten key themes, especially as each research article has explored each research question individually. This approach provides a clearer understanding of the underlying reasons behind the findings and is the primary goal of this general discussion subsection.

### 10.1.1 The conceptualisation of landscape

Despite advancements in European landscape science, it is evident that recent institutions at both national and regional levels still exhibit a persistent gap between contemporary landscape discourse and policy implementation. While national and regional institutions have increasingly mentioned the concept of landscape, national policies tend to frame it primarily as a socio-cultural or aesthetic/visual concept rather than as an integrated socio- ecological system.

At the regional level, the instruments analysed in Northern Portugal (LRCZCC 77/78, POOC-CE 1999, and POC-CE 2021) demonstrate differing conceptualisations of the landscape. The LRCZCC 77/78 focuses on biophysical, socio-cultural, and aesthetic aspects, while the POOC-CE 1999 and POC-CE 2021 emphasise nature conservation and biodiversity, with a strong association with protected areas. While the POC-CE 2021 presents a more holistic concept of landscape, its strategy still emphasises nature conservation and biodiversity protection. None of the plans address the perceptual and symbolic dimensions of the landscape, nor do they use the concept of landscape to define the boundaries of their plans. Although the LRCZCC 77/78 acknowledged the importance of adapting boundaries to reflect the coastal landscape, it refrained from implementing this approach, framing it instead as a study rather than a formal plan.

### 10.1.2 The integration of landscape

At the national level, a relevant finding was that, with the prevalence of the landscape model paradigm, landscape integration, emphasised a holistic, systems-based approach that considers the interdependent natural, cultural, social, and economic elements of a landscape, focusing on spatial connectivity, long-term vision and balancing human development with environmental conservation. Today, governance primarily focuses on outstanding coastal landscapes within the legal framework of protected areas, and landscape integration mainly occurs in the background or purpose sections of laws and policies without offering significant measures for landscape planning, protection, or management.

At the regional level, the findings revealed that the integration of landscape into coastal management instruments was guided by an understanding of landscape functionality, with particular emphasis on multifunctionality, connectivity, and fragmentation. Instruments such as the National Agricultural Reserve, National Ecological Reserve, and the National Protected Areas System were designed to protect the most relevant biophysical and socio- cultural values from urban development. However, their implementation varied across planning periods, as evidenced by the three coastal management instruments studied, reflecting evolving policy paradigms and the growing influence of nature and biodiversity conservation models at the International, European and sub-national levels.

### 10.1.3 The cause-effect of the conceptualisation and integration of landscape in Northern Portugal

The conceptualisation and integration of landscape in coastal management instruments in Northern Portugal have had a significant impact on the evolution of the coastal landscape. Early plans like the LRCZCC 77/78, with its broader vision for landscape planning and protection, aimed to mitigate urbanisation and preserve the coastal landscape values but were never implemented. Subsequent plans, such as the POOC-CE 1999 and POC-CE 2021, had a more limited scope, focusing on narrow buffer zones (500 meters instead of 3000 meters) after significant urban development had already occurred. This gap in regulatory frameworks during the 1965-1995 period led to substantial land use and cover changes, with urban expansion occurring outside protected areas. Had the LRCZCC 77/78's proposals been implemented earlier, they could have better-balanced urbanisation with coastal landscape protection, highlighting the missed opportunity for integrated coastal landscape planning. As already stated, the findings also emphasise the relevance of the National Agricultural Reserve, the National Ecological Reserve, and the National Protected Areas System in mitigating the impacts of urban development. However, the potential they could have had if they had been implemented in the 1980s, as Ilídio de Araújo intended, became evident in the results of this research.

### 10.1.4 Evolving Policy Paradigms

Four shifting policy paradigms, ranging from wilderness to landscape, nature conservation, and biodiversity conservation, have influenced the evolution of landscape conceptualisation and integration within Portuguese

environmental, landscape, coastal, and spatial institutions at the national level. These paradigms reflect the knowledge of influential actors as well as external influences of the European Union. However, they have not achieved full institutionalisation, as each paradigm builds upon its predecessor without systematic assessments before or after implementation. It is important to note that this evolutionary pathway has not kept pace with advancements in European landscape science or with the political commitment made by the Portuguese Government when ratifying the Council of Europe Landscape Convention in 2005.

### 10.1.5 Regional Reflections of National Shifts

The analysis of three regional coastal management instruments in Northern Portugal (LRCZCC 77/78, POOC-CE 1999, and POC-CE 2021) reveals how regional planning aligns with evolving national policy paradigms. The LRCZCC 77/78 reflected the holistic approach of the landscape model, while the POOC-CE 1999 shifted toward nature conservation, prioritising the landscape associated with protected areas. The POC-CE 2021 acknowledges a holistic conceptualisation of landscape but fails to integrate it into its planning strategies fully, as its strategy adopted a biodiversity-focused model. This progression of paradigms at the regional level highlights the influence of path dependency, the interests, knowledge and power of relevant actors, and the existence of rigid institutional structures, as Portuguese regional planning is hierarchically dependent on national policies.

### 10.1.6 Path Dependency and Interdependencies

Path dependency has significantly been influencing Portuguese coastal governance, with historical decisions shaping past, current and, probably, future policies. Transitions between policy paradigms in Portugal not only reconfigured actors' relationships and power dynamics but also revealed the evolving interplay between institutional structures and knowledge systems. These shifts underscore the fluctuating influence of key actors in response to changing priorities and external forces, such as European Union directives and strategies, while also highlighting the importance of interdependencies (the mutual reliance between actors and institutions) in shaping the conceptualisation and integration of the landscape. Additionally, our findings reveal how fixed institutional approaches, coupled with the absence of systemic reform, have constrained the integration of the landscape concept into coastal governance.

### 10.1.7 The role of institutional barriers and power structures

Institutional barriers, power structures, and the broader tension between environmental/landscape protection and competing urban development interests highlight systemic challenges in Portuguese coastal governance, including inadequate resources, legal constraints on integrating the concept of landscape, complex multi-level governance with fragmented authority, siloed actors, with limited trans and interdisciplinary collaboration, and resistance to change due to insufficient adaptability of the governance systems, which hinder the full realisation of innovative approaches. For example, the LRCZCC 77/78 study exemplifies an innovative, holistic approach to coastal landscape governance, but it was never concluded. As previously referred, the reasons are unclear. However, it may have faced internal opposition, similar to the challenges encountered with the implementation of the National Ecological Reserve, where external resistance from municipalities to development restrictions delayed regulation for nearly a decade. Institutional and power-related constraints perpetuate a fragmented coastal governance system.

### 10.1.8 The challenge of operationalising the landscape science in coastal governance

The concept of landscape has multiple meanings and varying methods for delineating its boundaries, which poses a significant challenge to governance systems traditionally structured around sectoral and politically administrative delimited planning instruments. Despite the adaptation and harmonisation of national frameworks to align with European Union directives, regulations, and goals, a process known as Europeanisation, the Council of Europe Landscape Convention, did not have the same effect in Portugal. The Convention's lack of enforceability diminished its practical impact compared to binding European Union directives. Paradoxically, during the earlier landscape paradigm of the 1970s and 1980s, Portuguese national and regional institutions were more aligned with the Convention's principles than after its formal adoption. As governance shifted toward narrower, conservation-focused models, the

influence of landscape, once central to planning, waned in favour of ecological and biodiversity priorities. The lack of formal endorsement of the Convention by the European Union highlights the challenges of fully integrating the landscape concept into policy frameworks, as it only represents a political commitment rather than a binding requirement like a European Union directive. As a consequence, this reinforces the need to elevate landscape science to a higher policy priority.

### 10.1.9 Fragmented governance and the lack of a specific and dedicated governance arena

Despite the recognition of landscape as a value for governance, planning, and management, there remains a significant barrier to translating this recognition into binding and effective planning strategies and plans, compounded by the fragmentation of governance structures and the lack of cross-sectoral coordination. The absence of a dedicated coastal landscape actor and institutions is a critical shortcoming. Despite efforts that have been made within the landscape model paradigm to create regional structures devoted to landscape planning, today, efforts to incorporate the landscape into spatial and coastal institutions are insufficient, as these institutions often lack clear, specific and efficient measures for landscape planning, protection and management. The vague language in laws and planning tools, particularly those developed after the adoption of the landscape model, undermines efforts to align with the Council of Europe Landscape Convention, leaving the coastal landscape more vulnerable to societal challenges and pressures.

### 10.1.10 Limited Political Will

The Portuguese case underlines a consistent lack of strong political will to reform coastal governance, with landscape and coastal planning and management remaining low on the political agenda. This lack of commitment is reflected in the absence of dedicated institutions and high-level actors focused on coastal landscape problems, resulting in inadequate resource allocation, short-term policy perspectives, and the continued sectoral exploitation and urbanisation of the coastal landscape. Policy development mainly adopts a short-term perspective, prioritising immediate (political) gains over long-term sustainability and resilience. While instruments like the National Ecological Reserve, National Agricultural Reserves, and the National System of Protected Areas have partially mitigated these impacts, the overall governance system remains insufficiently prepared to address the long-term challenges of coastal landscapes, especially when transformative change is needed to address the interrelated crisis we are living.

## 10.2 Main conclusions

This research aimed to explore the contribution of landscape in safeguarding the coastal landscape. Two research questions were explored through multiple explanatory case study research in Northern Portugal. Based on the main findings, it was possible to conclude that the answers to the two research questions are as follows:

**RQ1. How has the conceptualisation and integration of landscape within Portuguese coastal planning institutions evolved, particularly across national and regional scales?**

The conceptualisation and integration of landscape within Portuguese coastal planning institutions have shown that the concept of landscape has gained increasing prominence in coastal governance, reflected in its growing mention in legislation, policies, and planning instruments. However, this rise in recognition has coincided with a diminishing emphasis on the integrative potential of landscape science over time, with national policies often framing landscape primarily as a socio-cultural or aesthetic/visual concept. Despite this growing recognition, the integration of landscape into coastal management instruments has weakened, marking a shift away from seeing landscape science as an integral part of spatial and coastal planning. In Northern Portugal, the evolution of coastal management instruments saw a progression from a holistic approach in the LRCZCC 77/78 to a nature conservation-focused model in the POOC-CE 1999, followed by a focus on biodiversity conservation in the POC-CE 2021. This evolutionary pathway initially addressed outstanding natural and cultural landscapes, later expanded to all landscapes, and then regressed to focusing again on outstanding natural and cultural landscapes. Landscape integration was mainly associated with landscape functionality, with particular emphasis on multifunctionality, connectivity, and fragmentation, where the National Ecological and Agricultural Reserves and the National Protected Areas System played the most significant roles.

**RQ2. How has this evolution influenced coastal landscape change at the municipal level up to the present?**

The investigation into three municipal case studies (Vila do Conde, Póvoa de Varzim, and Esposende) demonstrated that higher levels of landscape integration could enhance coastal landscape protection, reinforcing the need to prioritise landscape within coastal governance frameworks. However, the degree of integration and resulting impact varies among the case studies. Municipalities with stronger landscape integration tend to exhibit better preservation of natural and cultural features. The research also demonstrates the potential role that the LRCZCC 77/78 study could have played if it had been completed and implemented.

While the findings and conclusions of this research provide valuable insights into the conceptualisation and integration of landscape within Portuguese coastal governance, it is important to acknowledge the limitations of this investigation.

### 10.2.1 Research limitations

Several limitations were identified across different sections of this thesis, highlighting areas for potential expansion in future research, as will be discussed further in subsection 10.2.2. Each limitation was detailed and justified in the respective scientific article. However, while these limitations made sense within the context of the individual articles, it is important to highlight that most of them are outside the scope of this PhD research due to constraints related to time, resources, data availability, and the broader objectives of the thesis. To avoid redundancy, only a concise summary of these limitations is presented here.

In Section 3 (State of the Art), the systematic review presented the following limitations: (1) exclusion of maritime governance and land-sea Interactions, (2) absence of coastal landscape planning and management debates (3) exclusion of grey literature, and (4) dominance of English scientific literature.

In the national-scale assessment (Section 7), two limitations were noted: (1) the exclusion of plans developed in Portugal during the timeframe, and (2) the omission of the role of the European Union and National funding schemes.

No specific limitations were identified at the regional scale (Section 8).



In Section 9, several important limitations were identified, including (1) exclusion of funding schemes' impacts on the evolution of the coastal landscape, (2) focus on land use and land cover changes to assess the evolution of the coastal landscape, (3) use of buffer limits instead of a defined coastal landscape character, and (4) focus solely on the land perspective.

Now that the research has concluded, reflecting on the past three years of exclusive dedication to its development, I realise that better anticipation of the time required for the publishing process and participation in international conferences would have been beneficial. Nevertheless, this journey has been an invaluable learning experience, and the feedback received throughout significantly enhanced the subsequent stages of the research. However, due to time constraints, I was unable to incorporate the perspectives of coastal and landscape Portuguese experts, whose insights could have provided additional depth and further enriched the findings of this thesis.

### 10.2.2 Contributions to a Future Research Agenda

This subsection proposes several avenues for future research to advance coastal landscape governance. These possibilities have emerged from the five articles produced in this thesis and are categorised into two groups: research specific to the Portuguese case study and broader research directions that hold implications beyond the Portuguese context. Although these categories are distinct, they are interrelated and together contribute to a more comprehensive understanding of coastal landscape governance.

**A. Portuguese case study research directions**

**A1. Barriers and challenges in landscape Integration**

1. What are the main barriers hindering the full implementation of the Council of Europe Landscape Convention in Portugal?
2. Why do plans fail to integrate landscape into strategies and measures?
3. How can landscape policy integration be improved?

**A2. Landscape Assessment and Perception**

4. How do formal and informal actors conceptualise the landscape?
5. What constitutes a coastal landscape within the Northern Regionof

Portugal, and how does this compare to other coastal regions across the country?

6. How do citizens perceive coastal landscape changes?

**A3. Coastal Landscape Governance operationalisation**

7. How could specific coastal landscape actors and institutions be developed?
8. How can land-sea interactions be effectively integrated into coastal landscape governance to ensure sustainable management of interconnected terrestrial and marine systems?

**A4. Landscape integration**

9. How is the ongoing implementation of the POC-CE 2021 programme influencing coastal landscape dynamics, and what is its anticipated long-term effectiveness?
10. How has the landscape been conceptualised and integrated in the past, and how is it currently addressed within the Municipal Director Plans?

**A5. Drivers of change and landscape services**

11. What are the main driving forces that have shaped and continue to influence the Portuguese coastal landscape?
12. What landscape services are provided by the National Ecological and Agricultural Reserves, and how can they be economically valued?

**B. Broader Research Questions**

**B1. Characterisation and Valuation of Coastal Landscapes**

13. What are the most relevant values, such as aesthetic, cultural, economic, and community perceptions, that need safeguarding in coastal landscape governance, and how can these be systematically identified and assessed?
14. What trade-offs and synergies arise in managing conflicts within coastal landscapes, and how can governance frameworks ensure equitable outcomes?

**B2. Governance Frameworks and Institutional Dynamics**

15. How can landscape science be better operationalised into policy and practice, bridging the gap between science, policy, and practice?
16. How can governance institutions move beyond political-administrative boundaries to embrace landscape units, multi-scale systems, and adaptive governance? What instruments and actors are needed for this transformation?

**B3. Comparative research**

17. How have coastal landscape systems evolved over time, and how effective are governance instruments in managing these systems?
18. How do political cycles influence the long-term evolution of coastal landscape governance?
19. How has the conceptualisation and integration of landscape in European coastal planning institutions evolved, and what factors, such as institutional priorities, political agendas, and socioeconomic pressures, have influenced this evolution?
20. How do institutions and actors involved in coastal landscape governance differ across countries?
21. How do integrated coastal zone management and a coastal landscape approach compare in theory and practice?

**B4. Justice, Power, and Equity**

22. How do power dynamics, narratives, scales, historical contexts, environmental justice, and equity shape coastal landscape governance?
23. How do landscape approaches address power structures and cultural perspectives, and how do they compare with indigenous-led approaches in fostering equity and inclusion?

In conclusion, while this thesis has primarily looked back to understand the evolution of the governance of coastal landscapes, the future demands an agenda that builds on this foundation to envision innovative and inclusive pathways forward. The following section offers a series of recommendations presented in the form of a manifesto, intended to contribute to the development of a European research agenda for advancing the field of coastal landscape governance. These recommendations aim to inspire collective action.

I hope to continue contributing to this research field, mobilising others to work toward coastal landscape governance. Indeed, the time for landscape is upon us.

**The Seaweed Raker,** 1889, James Clarke Hook. Presented by Sir Henry Tate 1894. © Tate. Photo: Tate.

# PART III — RESEARCH RECOMMENDATIONS

*"Never doubt that small group of thoughtful committed citizens can change the world; indeed, it's the only thing that ever has."*

*Margaret Mead*

**Reference**

Gonçalves, C., & Pinho, P. (2024). A manifesto for coastal landscape governance: Reframing the relationship between coastal and landscape governance. Ambio. 53, 1454–1465. doi: https://doi.org/10.1007/s13280-024-02040-5

**Contributions**

CG: Conceptualisation, Writing — original draft, Review & editing, Funding acquisition. PP: Writing — review & editing, Supervision, Funding acquisition. All authors have read and agreed to the submitted version of the manuscript.



# 11 A manifesto for coastal landscape governance

## Reframing the relationship between coastal and landscape governance

**Abstract**

There is an urgent demand for substantial reforms in the governance of coastal regions. Recent research advocates for a transformative shift in European coastal governance system toward a landscape-governance approach. This perspective, informed by a narrative literature review on coastal and landscape governance, explores the potential value of coastal landscape governance, drawing on the Council of Europe Landscape Convention. Our results, presented in the form of a manifesto, underscore the need to move beyond political-administrative boundaries and address all coastal landscapes as socio-ecological systems. It emphasises the necessity for the State to recognise them as a public and common good, establishing a specific governance arena with dedicated actors and institutions. The manifesto also advocates for landscape justice through knowledge co-production, urging transformative change and landscape-based regional design to envision alternative futures. Additionally, it calls for regionalising coastal landscape governance and invites scholars from other transdisciplinary and interdisciplinary perspectives to contribute to this research agenda.

**Keywords:** Climate crisis; Integrated coastal zone management; Landscape approaches; Landscape sustainability science; Socio-ecological systems.

## 11.1 Introduction[44]

The sustainable governance of coastal regions continues to be considered a relevant challenge in the 21st century (Kelly et al., 2019, p. 1). Despite scientific and political efforts to implement an Integrated Coastal Zone Management approach in many coastal countries, there is an evident need for large-scale reform in coastal governance (Pittman & Armitage, 2016). Researchers are calling for an evolved governance paradigm that embraces the boundaries, dynamics, and specific challenges of the coastal socio-ecological system (Schlüter et al., 2020a; Van Assche et al., 2020a).

In landscape research, the debate explores the advantages of using the landscape as a medium for governance at different scales, in addition to its role as an object of planning and management (Van Oosten et al., 2021; Van Rooij et al., 2021). Since 2007, following the systematic conceptualisation of landscape governance provided by Görg (2007), there has been a growing debate regarding both its conceptualisation and operationalisation. However, the body of knowledge on coastal landscapes and their governance is still relatively small (Döring & Ratter, 2018). Nevertheless, recent research on the evolutionary governance of the Portuguese coastal region since 1950 (Gonçalves & Pinho, 2024a) has demonstrated the instrumental role that landscape thinking has played in coastal governance. The study's findings highlight the correlation between the level of landscape integration within the governance system and the protection of coastal regions. The authors advocate for a paradigm shift in European coastal governance towards a landscape-governance approach, emphasising the urgency for substantial reforms in the governance of coastal regions (Kelly et al., 2019) and drawing upon the principles outlined in the Council of Europe Landscape Convention (Council of Europe, 2000a, 2016). The Convention was introduced in 2000 by the Council of Europe with the aim of promoting landscape protection, management and planning, as well as facilitating European cooperation on landscape issues (Council of Europe, 2000a, 2016).

The proposed reform of coastal governance towards coastal landscape governance, as argued by Gonçalves and Pinho (2024a), aims to establish a holistic governance framework that prioritises the so-called *coastal condition* [what makes coastal areas unique] (Van Assche et al., 2020, p. 3). Besides acknowledging the unique characteristics of coastal areas, it also recognises the dynamics of the coastal socio-ecological system and gives prominence to the voices of coastal communities. This approach builds on the conceptualisation of landscape governance as a new paradigm for the governance of coastal regions. While the potential implications of this paradigm shift remain unexplored, their arguments align with ongoing discussions of coastal governance (Pittman & Armitage, 2016; Schlüter et al., 2020a), of landscape governance (Görg, 2007; Kozar et al., 2014), and of Integrated Landscape Approaches (Reed et al., 2020).

In this perspective article, we aim to explore the potential advantages of reorienting coastal governance towards coastal landscape governance. Through a critical examination of the broader scholarly discourse on coastal and landscape research, we discuss the theoretical value of coastal landscape governance as a catalyst for reframing the relationship between coastal and landscape governance. This article, presented in the form of a manifesto, is structured as follows (Figure 40). The first part, comprising this introductory section, serves to underscore the need for this manifesto. The second part offers a succinct overview of the debates on coastal governance and landscape governance, contextualising the imperative need for coastal landscape governance within the European context. Lastly, part three, the core of this article, presents and discusses the manifesto's seven recommendations to reframe the relationship between coastal and landscape governance towards coastal landscape governance.

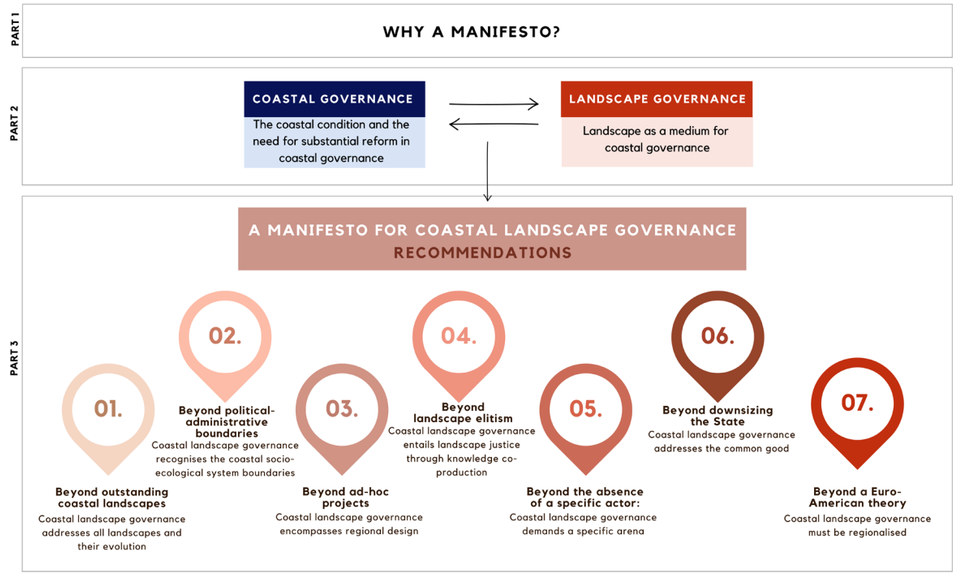


**Figure 44** Structure of the perspective paper and the seven recommendations of the manifesto for coastal landscape governance

44 The original title was published as "Part One: Introduction".

## 11.2 Contextualising coastal and landscape governance debates[45]

### 11.2.1 The coastal condition and the need for substantial reform in coastal governance

Coastal regions are dynamic and complex socio-ecological systems, characterised by intricate interactions among land, sea, and atmosphere (Bazant-Fabre et al., 2022). These regions hold significant ecological, cultural, aesthetic, social, and economic values (de Andrés et al., 2023). However, the process of coastalisation[46], prevalent in most coastal countries (Lagarias & Stratigea, 2023), combined with the impacts of climate change (IPCC, 2022b), poses several threats to the integrity and governance of coastal regions.

Globally, intact coastal regions are becoming increasingly rare (Williams et al., 2022), a trend also observed in Europe. With 40% of the European Union's population living near the coast and 75% of its foreign trade conducted by sea (European Environment Agency, 2024), these regions face immense pressures from human activity. Furthermore, rising sea levels, extreme weather events, inundations, and aggravation of levels of erosion exacerbate the vulnerabilities of European coastal regions.

Indeed, despite five decades of Integrated Coastal Management efforts, critical shortcomings persist, prompting continued advocacy for integrated approaches from both the political and the scientific communities (Kelly et al., 2019). These shortcomings include overlapping political-administrative structures and actors, as well as challenges in multi-level governance (Eger et al., 2021). Fragmented and sectoral approaches prevail (Pérez-Cayeiro et al., 2019), with limited involvement of actors, particularly local coastal communities (Van Assche et al., 2020a). Additionally, there is a lack of innovative mechanisms for policy integration, coordination, and cooperation (Eger et al., 2021), along with unstable policy discourses and shifting paradigms at a global scale without ex-ante or ex-post assessment of their impacts (Flannery & McAteer, 2020). Furthermore, recent discussions highlight the absence of formal governance arrangements with specific actors[47] and institutions[48] recognising the coastal zone as a socio-ecological system within its specific governance arena while attending to its evolutionary governance pathway (de Andrés & Barragán-Muñoz, 2022; Van Assche et al., 2020a).

The severity of climate challenges in most European coastal countries requires a re-evaluation of how we conceptualise and operationalise coastal governance (de Koning et al., 2023). Such a re-evaluation encompasses not only the capacity of the coastal system to adapt and transform in response to new climate conditions but also the ability of individuals and organisational actors to drive systemic changes within society (Sousa et al., 2023). We argue that such an alteration must start with redefining how we conceptualise the coastal zone. Understanding the character and dynamics of the coastal system is fundamental for any significant shift. This shift involves embracing the socio-ecological boundaries and dynamics, incorporating the "coastal condition", and recognising the interdependence of governance elements such as actors, institutions, power, knowledge, and narrative (Van Assche et al., 2014). Landscape governance can contribute to this paradigm shift, as will be discussed in the following sections.

### 11.2.2 Landscape as a medium for coastal governance

Landscape governance is based on the concept of landscape, which entails a multi-sector, multi-actor, and multi-level process of decision-making and interaction (Van Oosten et al., 2021). However, the definition of landscape lacks consensus within scientific discourse, as it can vary depending on one's scientific background (Kühne, 2019). In this perspective, we adopt the formal definition of landscape as outlined in the Council of Europe Landscape Convention, which defines landscape as "*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*" (Council of Europe, 2000a, p. article 1a; 2016). Similarly, landscape governance also does not has a universal definition as the debate is still evolving, yet its potential for success is widely acknowledged in landscape research (Gonçalves & Pinho, 2022). This potential arises from its inherent scalability for intervention,

45 The original title was published as "Part Two: Contextualising coastal and landscape governance debates".

46 Coastalisation is a concept that refers to the rising concentration of population and activities in specific coastal zones (Lagarias & Stratigea, 2023).

47 Actors are participants (individuals, groups or organisations) in governance, formally or informally (Beunen et al., 2015).

48 Institutions are rules (regulations, norms, laws, policies, and plans) of coordination between actors (Beunen et al., 2015).

integration of natural and cultural values, and capacity to provide common ground for various disciplines, sectors and stakeholders (Albrechts et al., 2020). Some scholars even argue that landscape governance is the spatialisation of environmental governance (Visseren-Hamakers, 2015).

Coastal landscape governance builds on the conceptualisation of landscape governance, focusing specifically on the coastal landscape. The coastal landscape represents a unique landscape unit shaped by a particular combination of environmental, cultural, perceptual, and symbolic elements, as well as identifiable dynamics that set it apart from the rest of the territory (Nogué et al., 2016b). Coastal landscapes are among the most fragile and dynamic types of landscapes due to the continuous interactions between land and sea, alongside their appeal for human activities, which subject them to unique pressures. Biophysical elements do not solely determine coastal landscapes. Coastal landscapes are also shaped by social, economic, and cultural relations established over time with their inhabitants, influencing their identity and character and making their governance more challenging (Egberts, 2019; Schlüter et al., 2019). The coastal landscape is also a sensorial experience that can have multiple perceptions, meanings and values depending on the experiences and practices of those who are experiencing it, as demonstrated by Döring and Ratter (2021) research on the Wadden Sea.

It is imperative to conduct further research on coastal landscape governance due to its unique challenges compared to the governance of other landscapes. Coastal landscape governance entails managing both terrestrial and marine environments, which introduces governance complexities. These complexities involve addressing rapidly changing environmental conditions while also considering the needs, experiences, and perceptions of coastal communities. The significance of local coastal communities for coastal governance is increasingly emphasised in scientific discussions, particularly in light of climate change impacts (McKinley et al., 2022; Van Assche et al., 2020a). Moreover, coastal landscape governance complexity includes navigating overlapping jurisdictional boundaries on land and at sea, balancing competing interests in land use - such as conservation, recreation, cultural values, and economic interests - meeting pluralistic goals, and integrating local priorities and knowledge into the governance system.

The diversity of conceptualisations of the landscape is also reflected in various methods for identifying and characterising coastal landscapes as they are rooted in a range of epistemological backgrounds and scientific disciplines



(Antrop, 2006; Kühne, 2019; Simensen et al., 2018; Taylor & Xu, 2019). This diversity of concepts and methods can lead to criticism regarding its potential to rethink coastal governance towards coastal landscape governance. However, like landscape, the coastal governance object also has no established and consensual concept (coastal zone, coastal area, littoral, coast, coastal socio-ecological system) or method to identify its boundaries (de Andrés & Barragán-Muñoz, 2022; Kay & Alder, 2005; Pittman & Armitage, 2016). Also, the scientific demand for interdisciplinary and transdisciplinary approaches, building both from natural and social sciences to reinforce coastal governance (Partelow et al., 2023), along with the call for coastal governance to move beyond administrative boundaries (Van Assche et al., 2020a), creates several opportunities for coastal landscape governance.

At the European level, these opportunities are reinforced by the existence of formal definitions of landscape (Antrop, 2017), such as the one established by the Council of Europe Landscape Convention (Council of Europe, 2000a, 2016). The Convention also creates opportunities for landscape governance as it advocates for the establishment of a specific governance arena for landscape in its signatories-countries. Research is currently very limited on the connections between the Convention and scientific discussions on landscape governance. However, the review conducted by Pătru-Stupariu and Nita (2022) concerning the impacts of the Convention on interdisciplinary and transdisciplinary research indicates the emergence of landscape governance as a new study area in Europe. The review also expects continuous reinforcement of Landscape Sustainability Science[49] as a research trend. This recognition underlines the importance of expanding research on the conceptualisation and operationalisation of landscape governance in Europe, and we claim that this is particularly relevant regarding coastal landscapes, as it was previously said, due to its significance for Europe and because they are especially susceptible to the impacts of climate change.

Furthermore, landscape governance is strongly related to discussions about Integrated Landscape Approaches (Mpofu et al., 2023), as it is the dominant approach to operationalising landscape governance in the Global South (Gonçalves & Pinho, 2022). Reed et al. (2020, p. 2), building on the literature, describe these as the *"next generation of integrated approaches"*. We

49 "*Landscape sustainability science is a place-based, use-inspired science of understanding and improving the dynamic relationship between ecosystem services and human well-being in changing landscapes under uncertainties arising from internal feedbacks and external disturbances*" (Wu, 2013, p. 999)

underscore the relevance of further research into the complementarities and contradictions regarding Integrated Coastal Zone Management or Marine Spatial Planning. Conceptually, Integrated Landscape Approaches possess two intrinsic characteristics that warrant exploration when compared with Integrated Coastal Zone Management or Marine Spatial Planning: first, they are grounded on the landscape concept, which means that they develop inclusive place-based policies/strategies, not limited by political-administrative boundaries, and second, they consider trade-offs as a critical premise for establishing management goals. Trade-off assessment is also considered a fundamental research area for improving coastal governance efficiency and effectiveness (Davies et al., 2018).

## 11.3 A Manifesto for Coastal Landscape Governance[50]

Some may consider the following arguments utopian, acknowledging the potential challenges in implementing coastal landscape governance. As Meisner (1982, p. 4) suggests, *"it is the striving for utopia, not its accomplishment, that is the dynamic force in history – and indeed a historically necessary one"*. Instead of waiting for a future time when civil society will demand change, possibly reaching a point where undoing the losses suffered becomes difficult, the appropriate moment to begin is now (Elrick-Barr et al., 2024). The following manifesto can serve as a guiding framework for a new European coastal landscape governance agenda, envisioning a roadmap for the future. However, we also argue that it is fundamental to increase empirical research on coastal landscape governance to validate its theoretical added value. We invite other researchers from other interdisciplinary and transdisciplinary perspectives to contribute to this research agenda.

### 11.3.1 Beyond outstanding coastal landscapes: coastal landscape governance addresses all landscapes and their evolution

In Europe, the conservation of nature and landscape began in the 1950s, primarily through the establishment of protected natural areas (Antrop, 2013). The Council of Europe Landscape Convention represents a shift from early landscape conservation policies that were only focused on protecting or enhancing exceptional coastal landscapes as crystallised objects (Antrop, 2013). It emphasises the significance of ordinary landscapes for quality of life and asserts that Member States must legally recognise the landscape in the law (Council of Europe, 2000a, 2016). However, implementing a holistic landscape conceptualisation across most European countries remains challenging. Presently, there is still an emphasis on protecting remarkable coastal landscapes or approaching them purely as scenic landscapes within the legal framework of protected areas (Gonçalves & Pinho, 2024a; Rangel-Buitrago, 2019). We contend that signatories-countries of the Council of Europe Landscape Convention must establish a governance system that considers all coastal landscapes, whether natural or cultural, urban or rural, marginal or central. This entails identifying what constitutes a coastal landscape not only at present but also understanding its evolutionary trajectory to adapt coastal landscape governance models to reflect their character across scales and timelines. But considering all coastal landscapes, a question arises whether they should be limited by the boundaries of coastal municipalities, regions, or countries.

### 11.3.2 Beyond political-administrative boundaries: coastal landscape governance recognises the coastal socio-ecological system boundaries and dynamics

In many European coastal countries, contemporary coastal governance is characterised by multiple political-administrative boundaries, often overlapping on land and at sea (de Andrés & Barragán-Muñoz, 2022). The increasingly global and European focus on the blue economy and marine spatial planning (Rafael et al., 2024) further complicates coastal governance, highlighting the importance of land-sea interactions (Innocenti & Musco, 2023). As discussed in section 2.1., there is a growing call for the more effective integration of the coastal condition into the governance system while attending to its evolutionary pathway as a means to reinforce the adaptability of the governance system (Van Assche et al., 2020a). Consequently, the debate on coastal governance underscores the necessity of recognising coastal zones from a socio-ecological perspective, transcending political-administrative boundaries (de Andrés & Barragán Muñoz, 2022; Schlüter et al., 2020; Van Assche et al., 2020). This recognition also involves addressing land-sea

50 The original title was published as "Part Three: A Manifesto for Coastal Landscape Governance".

interactions to adapt the governance system to handle coastal dynamics and their associated challenges.

Coastal landscape governance presents several opportunities to address these challenges as its governance system focuses on the coastal landscape. A coastal landscape is a concept rooted in landscape research that, despite its ontology and epistemology, is not limited by artificial boundaries. In Europe, as already stated, coastal landscape governance can be grounded in the formal concept of landscape promoted by the Council of Europe Landscape Convention (Council of Europe, 2000a). The Convention's definition of landscape (see Section 2.2.) builds on a positivist and constructivist perspective. Besides assuming the coastal landscape as a socio-ecological system with a temporal-spatial scale, it also recognises it as an intangible, aesthetic and sensorial value, where democratic values are a central point (Antrop, 2006; Egoz et al., 2018; Haller & Branca, 2022). This holistic perspective of defining a coastal landscape can help to identify the coastal condition of a specific place, which is quite relevant as the signatory members of the Convention are demanded to identify and assess their landscapes throughout its territory, involving its citizens in this process from an evolutionary perspective (Council of Europe, 2000a, 2016). This obligation creates a formal opportunity for coastal landscape governance, as most European countries have signed and ratified the Convention. Furthermore, while the focus of this article may not extend to this particular aspect, it is relevant to note that since the 2016 amendment to the Convention, any country worldwide can sign it. This significant change effectively opens the doors to expanding coastal landscape governance beyond European borders.

A critique already mentioned in Section 2.2. is that various scientific perspectives and methods exist (Simensen et al., 2018) to identify a coastal landscape. However, we claim that this can be an opportunity to strengthen their governance, as the multiple meanings of landscape and methods can facilitate communication and cooperation between different areas of knowledge. Also, the juxtaposition of the different perceptions can lead to a more accurate perspective of the diverse viewpoints of the coastal socio-ecological system and the trade-offs necessary to reach a shared future vision. It also allows for the approach of power relations between the different stakeholders. Coastal landscape governance must, therefore, cultivate interdisciplinary and transdisciplinary knowledge spanning scientific disciplines, sectors, and policy domains to develop effective and efficient policies. For example, in the case of Portugal (Gonçalves & Pinho, 2024a), coastal landscape policies operate between coastal, environmental, landscape and spatial planning institutions and actors, being necessary to involve stakeholders with different and complementary expertise and imaginaries of the coastal landscape.

Another critical point is that the limits of what constitutes coastal landscape demand a re-evaluation of the landscape governance system to embrace its boundaries and dynamism into the different components of the governance system itself (Nogué & Sala, 2018a). Despite the obligation to identify its landscape in the Convention's signatories countries, in many coastal countries, coastal landscape units may lack the necessary legal framework to function effectively (Nogué & Sala, 2018b). Some examples, such as those in Galicia, Spain, influenced by the Convention, have already utilised the concept of a landscape unit in developing their coastal zone management plans rather than confining it to a buffer area or administrative boundaries (García-García & Sanchiz, 2017).

Further research is necessary to understand how coastal landscape governance has been occurring in Europe and to explore the necessary legal or institutional changes for integrating coastal landscape governance into the existing legal structures, as this knowledge is still unsufficient. Empirical evidence is fundamental to help researchers and policymakers tailor possible new configurations of coastal landscape governance. Even so, we must highlight that research on other complementary topics can also offer valuable insights as they approach governance beyond statutory frameworks. It is fundamental to explore relationships between these similar debates. For example, soft planning has been gaining relevance in Europe as a new planning and governance concept. Soft planning can be a helpful debate as it "*acts in complex, non-statutory institutional settings, breaking with established government structures, fixed administrative boundaries and rigid organisational frameworks*" (Cavaco & Costa, 2020, p. 1). Another relevant discussion is centred on watershed-scale and transboundary governance, as their governance is also not limited by established legal political-administrative boundaries. For example, the use of the social-ecological watershed system for effective fisheries management, maintaining watershed resilience, is discussed by Nguyen et al. (2016). But, at what scale should the coastal landscape be governed?

### 11.3.3 Beyond ad-hoc projects: the role of regional design in coastal landscape governance

Coastal governance operates across various scales, ranging from the global to the local scale. Nevertheless, the systematic review conducted by Gonçalves and Pinho (2022) revealed a predominant focus on its operationalisation at the local scale. This observation is further supported by Cabana et al. (2023), who also advocate for increased emphasis on the regional scale within coastal governance. Indeed, Neuman and Zonneveld (2018) assert that the regional scale serves as an effective intermediary between the local initiatives and the broader national and global impacts. This assertion resonates with the argument theorised by Wu (2013). In introducing the concept of Landscape Sustainability Science, Wu (2013) emphasises the need for place-based research on landscape and at regional scales. He claims that the "*regional scale requires planning and design to "optimise" the spatial pattern of different landscapes types*" (Wu, 2013, p. 1017).

In the context of coastal landscape governance, we also recognise the regional scale as pivotal for developing effective governance systems. While it is relevant to have a vision of the relationship between all scales (from the global to the local), the regional scale provides a framework for delineating the boundaries of the coastal landscape, recognising its natural and cultural assets and addressing its interactions with national and global levels. Moreover, the regional scale also enables the development of coherent guidelines at the local level for project-specific aspects without compromising the larger scales required to encompass ecological, cultural, social, visual and aesthetic values that define the coastal condition.

Reflecting on the appropriate instruments to operationalise coastal landscape governance and on the argument of Wu (2013, p. 1017) that the regional scale demands planning and design, we assert the relevance of landscape-based regional design (Nijhuis et al., 2020). Landscape-based regional design, as originally conceptualised by McHarg (1969), is an interdisciplinary approach to ecological planning and design. Today, it incorporates knowledge from systems thinking and complexity theory to develop comprehensive regional planning and design strategies that prioritise the biophysical landscape structure and natural processes (Nijhuis et al., 2020) while also considering existing cultural, aesthetic, and sensory values. A landscape-based regional design allows for the development of open-ended strategies that seek a set of solutions for a coastal landscape, shaping new landscape imaginaries of coastal futures that guide and anticipate its development (Nogué & Wilbrand, 2018). A landscape-based regional design strategy must visually illustrate how various stakeholder's knowledge, interests and needs can be conciliated to formulate a cross-sectoral, place-based strategy tailored to a specific coastal landscape within its geographical, cultural, political and economic context. Landscape-based regional design also allows scientists, policy-makers, the private sector and civil society to explore alternative scenarios under uncertainty. This approach facilitates the integration of diverse perspectives and fosters collaborative decision-making processes, ensuring that coastal governance initiatives are inclusive, contextually relevant, and sustainable.

We also argue that landscape-based regional design must be developed using an Integrated Landscape Approach (Reed et al., 2020). An Integrated Landscape Approach demands continual learning, adaptive management, the identification of shared values, accounting of trade-offs on differing landscape uses, awareness of various governance levels, recognition of all relevant actors, transparency through mutual understanding amongst actors, clarity on rights and responsibilities of the actors, participatory monitoring while recognising different knowledge systems, resilience and enhancing the capacity of actors to engage (Mpofu et al., 2023). However, who are the 'right' stakeholders to be involved?

### 11.3.4 Beyond "landscape elitism": coastal landscape governance entails landscape justice through knowledge co-production

In coastal governance, the participation of the 'right' stakeholders is crucial in light of the growing importance of knowledge co-production between researchers and non-academic actors (Celliers et al., 2023). The 'right' stakeholders "*must be able to act in some meaningful way*", and for that, they need to have agency[51] (Celliers et al., 2023, p. 1419). Coastal governance frequently fails to recognise and incorporate local communities' knowledge, posing challenges in resource management amidst social-ecological shifts (Van Assche et al., 2020a).

51 "*Agency can be defined as the capacity of individuals and collective actors to change the course of events or the outcome of processes*" (Celliers et al., 2023, p. 1419).

In landscape research, the idea of justice, facilitated through knowledge co-production, serves as a central pillar of the Council of Europe Landscape Convention (Kristensen & Primdahl, 2020). The Convention advocates for the formulation of 'landscape quality objectives[52]', moving away from exclusive expert decision-making known as 'landscape elitism' (Scott, 2011). Egoz and Nardi (2017) emphasise the importance of the 'right to the landscape' in enhancing the quality of life and in pursuing landscape justice. They assert that landscape justice supports landscape democracy (Egoz et al., 2018; Gailing & Leibenath, 2017). Landscape democracy advocates for bottom-up approaches, recognising individuals as the foundation of any landscape and embracing diverse perspectives as a tool for social justice (Gailing & Leibenath, 2017).

Coastal landscape governance embodies climate and landscape justice through knowledge co-production, emphasising the formulation of landscape quality objectives to envision and guide future regional strategies. These objectives must reflect the 'right' stakeholder perspectives (Celliers et al., 2023), including local coastal communities, fostering democratic and equitable processes. While not everyone may achieve their desired outcomes, discussions on future coastal visions are essential catalysts for social change and landscape justice. Reassessing power dynamics and institutional structures is imperative for producing political changes benefiting marginalised coastal communities. The Landscape Observatory of Catalonia (Spain) serves as an excellent example of involving local communities and stakeholders in defining landscape units and quality objectives through a centre that involves the nexus of research-practice-politics (Nogué et al., 2016b). Indeed, the innovative approach of the Catalonia Government in establishing the Landscape Observatory of Catalonia to implement the Convention, underscores the feasibility and effectiveness of the political will in reshaping the landscape governance system. Nonetheless, given that not all regions and countries are like Catalonia (De Montis, 2014), a question remains: how should the governance system be transformed towards coastal landscape governance?

52 "*The formulation by the competent public authorities of the aspirations of the public with regard to the landscape features of their surroundings*" (Council of Europe, 2000a, p. article 1c; 2016)



### 11.3.5 Beyond the absence of a specific actor: coastal landscape governance demands a specific arena

Policy integration is one of the most significant challenges of coastal governance in the 21st century (Van Assche et al., 2020a). The authors assert that coastal governance often faces challenges stemming from policy fragmentation, leading to inadequate policy integration and coordination among the various institutions and stakeholders responsible for planning and managing the coast. These challenges, Van Assche et al. (2020a) argue, are further compounded by the limited understanding of the complex ecological processes and socio-economic dynamics that shape coastal landscapes.

In response to these challenges, Van Assche et al. (2020a) advocate for the creation of a separate arena solely dedicated to coastal governance, designed with a specific focus on addressing the complexities intrinsic to the coastal condition. They highlight the need to embrace the coastal governance evolutionary pathway, including between land and sea, emphasising that only with a deep understanding of existing governance structures and integration mechanisms can researchers and policymakers propose the necessary structural and institutional changes fundamental to establishing this new governance arena.

Having a specific and tailored governance system is crucial, as in many European countries, coastal, environmental, landscape, and spatial planning operate under different governance systems, often resulting in conflicting interests, narratives, and power relations (Rodríguez-Rodríguez & Sinoga, 2022). Moreover, as already stated, land-sea interactions, in most cases, also involve different actors with varying jurisdictions, responsibilities, and interests, thereby complicating multi-level governance (Kerr et al., 2015).

We also suggest that advancing coastal landscape governance requires establishing a dedicated arena with its institutions, and actors to approach the coastal landscape as a unifying spatial area with a long-term strategy. Establishing a dedicated coastal landscape governance arena can help mitigate impacts on the coastal socio-ecological system and manage various pressures.

It is fundamental to implement adaptive and integrated policies and ex-ante and post-assessment instruments to monitor changes in the coastal landscape over time. The responsibility for creating such a structure lies with the State, which should restructure the governance system according to its own form of government. The State must define the governing system, establishing

principles, values, scales, institutions and actors that set the stage for planning and management approaches. This restructuring entails allocating the necessary institutional, financial, and human resources, as well as establishing the political and policy developments necessary to operationalise it. Coastal landscape governance should also encompass its relationship with the planning and management institutions by exploring the relevance of an Integrated Landscape Approach as a bridge between governance, planning and management.

### 11.3.6 Beyond downsizing the State: coastal landscape governance addresses the common good

Coastal policy trends in Europe have been changing without any assessment, replacing one paradigm with another without fully understanding their impact on the coastal condition (Gonçalves & Pinho, 2024a). Also, in many coastal countries, over the past decades, the State has downsized its role following market and neoliberal ideology (Tafon et al., 2021). In some cases, it has even privatised stretches of the coastline (Cabral & Alino, 2011). This process often leads to inadequate resource allocation, limited policy development with a short-term focus, overexploitation of coastal resources and landscape degradation, which in turn increases the challenges in adapting to climate change.

As previously stated, coastal landscape governance involves an ongoing dialogue and consensus-building process with non-public actors and citizens through knowledge co-production. However, we also claim that the State must play the most significant role in governing and ensuring that the coastal landscape remains a common and public good (Ostrom, 2015). The State must reassume control of coastal landscape infrastructure instead of subjecting public goods to the priorities of market investors. It is fundamental to make coastal landscape governance a political priority, raising awareness among policymakers about the importance and vulnerability of coastal landscapes. Citizens also play a fundamental role in demanding that their coastal landscapes be protected and managed sustainably, as the consequences of mismanagement directly impact or neglect them (Falaleeva et al., 2011). Debates on future visions for the coastal landscape are vital catalysts for social change away from market ideologies and interests. The State must create an ambitious shared vision to mobilise society to tackle the climate crisis and find sustainable solutions.



### 11.3.7 Beyond a Euro-American theory: regionalising coastal landscape governance

Landscape research is still mainly rooted in a Euro-American perspective (Antrop, 2006, 2013). Nevertheless, it is worth noting that the empirical debates on landscape governance and Integrated Landscape Approaches have played a crucial role in addressing landscape forest restoration in the Global South. This evidence is primarily influenced by the involvement of various international organisations, such as the FAO, IUCN, GLF, and WWF, which have been instrumental in politicising these debates. Furthermore, also in the Global South, it is worth mentioning that the aspiration and scope of the Council of Europe Landscape Convention have significantly influenced the emergence of the Latin American Landscape Initiative and later its calls for an International Landscape Convention (Jorgensen, 2017).

Despite this perspective mainly focuses on European coastal landscapes, we acknowledge the necessity to regionalise coastal landscape governance. Only a rigorous theoretical and empirical discussion built from the Global North and South, and from different interdisciplinary and transdisciplinary perspectives, will be able to build a coastal landscape governance theory that responds not only to European challenges but also to global governance challenges. Coastal landscape governance must engage with context-specificities and diversities around coastal landscapes and the local communities and actors that shape them to build a better and just landscape.

## 11.4 Concluding Remarks

There is an imperative need for transformative change in European coastal governance. Transformative change depends on its transformative capacity. By challenging established governance frameworks as suggested in this perspective, transformative capacity can be built/strengthened in order to catalyse a fundamental and systemic transformative change toward more sustainable pathways. Our manifesto, diagrammatically represented in Figure 44, aims to catalyse and instigate a European research commitment to and through the governance of the coastal landscapes, acknowledging the limited scientific debate in this field. It also intends to elucidate its significance for the management of the coastal landscape, presenting several recommendations. We propose a paradigm shift towards coastal landscape governance, arguing

for the recognition of coastal landscapes as unique socio-ecological systems and advocating for the establishment of dedicated governance arenas building on the Council of Europe Landscape Convention.

Our manifesto also emphasises the importance of considering all coastal landscapes, promoting landscape justice through knowledge co-production, and prioritising the common good over market interests. Furthermore, the manifesto calls for landscape-based regional design and highlights the need for a specific governance arena with inclusive and anticipatory governance approaches. Moreover, the manifesto also acknowledges the importance of regionalising coastal landscape governance, recognising the diverse perspectives and contextual specificities across different coastal regions that can contribute to this research agenda.

Our perspective serves as a call to action for researchers, policymakers, and stakeholders to collaborate in redefining coastal governance paradigms towards a more inclusive, adaptive, and justice-oriented framework. Landscape research can have a significant impact on driving this transformation, as it was demonstrated in Part Three of this article. By embracing coastal landscape governance, we can strive towards a future where coastal regions are sustainably managed, more resilient to environmental challenges, and more equitable for all stakeholders involved. While many doubts, questions or concerns may arise with our perspective, we considered that this research agenda and this call for change can serve as a starting point for action. It is essential to do so. Who is willing to join us?



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# Part A
# Articles Appendices

# Appendix 1 – Systematic Review Database

## 1a: Coastal Governance Database

| ID | TITLE | AUTHORS | YEAR | JOURNAL |
|---|---|---|---|---|
| 1 | Notes on California's coastal governance: A reply to Peter Douglas | Stanley Scott | 1978 | Coastal Zone Management Journal |
| 2 | Governing the US Coastal Zone: An Unresolved Issue | David W. Fischer | 1990 | Ocean & Shoreline Management |
| 3 | Implications of the Earth Summit for Ocean and Coastal Governance | Biliana Cicin-Sain<br>Robert W. Knecht | 1993 | Ocean Development and International Law |
| 4 | Policy issues and management framework of Chinhae Bay, Republic of Korea | Jihyun Lee | 1998 | Ocean & Coastal Management |
| 5 | Assessing Progress Toward the Goals of Coastal Management | Stephen B. Olsen | 2002 | Coastal Management |
| 6 | The effects of stakeholder interactions on capacity for integrated coastal governance in Morocco and Tunisia | Guy Jobbins | 2003 | Aquatic Ecosystem Health & Management |
| 7 | Towards integrated coastal management in Solomon Islands: Identifying strategic issues for governance reform | Marcus B. Lane | 2006 | Ocean & Coastal Management |
| 8 | Governance for Sustainable Coastal Futures | Jessica Milligan<br>Tim O'Riordan | 2007 | Coastal Management |
| 9 | Managing coastal resources in the 21st century | Michael P Weinstein<br>Ronald C Baird<br>David O Conover<br>Matthias Gross<br>Jozef Keulartz<br>David K Loomis<br>Zev Naveh<br>Susan B Peterson<br>Denise J Reed<br>Emery Roe<br>R Lawrence Swanson<br>Jacques AA Swart<br>John M Teal<br>R Eugene Turner<br>Henny J van der Windt | 2007 | Frontiers in Ecology and the Environment |
| 10 | Governance Responses to Rapid Growth in Environmentally Sensitive Areas of Coastal Australia | Nicole Gurran<br>Edward J. Blakely<br>Caroline Squires | 2007 | Coastal Management |

| ID | TITLE | AUTHORS | YEAR | JOURNAL |
|---|---|---|---|---|
| 11 | Interviewing people about the coast on the coast: Appraising the wider adoption of ICZM in North East England | Peter Chaniotis<br>Selina Stead | 2007 | Marine Policy |
| 12 | Contrasting marine policies in the United States, Mexico, Cuba and the European Union: Searching for an integrated strategy for the Gulf of Mexico region | Ivonne Cruz<br>Richard J. McLaughlin | 2008 | Ocean & Coastal Management |
| 13 | Strategic coastal governance issues in Fiji: The challenges of integration | Marcus B. Lane | 2008 | Marine Policy |
| 14 | Ecological restoration and estuarine management: placing people in the coastal landscape | Michael P. Weinstein | 2008 | Journal of Applied Ecology |
| 15 | Coastal governance in North West Europe: An assessment of approaches to the European stocktake | A.M. O'Hagan<br>R. Ballinger | 2009 | Marine Policy |
| 16 | Introduction: The Future of Coastal Areas Challenges for Planning Practice and Research | Bernhard Glaeser<br>Andreas Kannen<br>Hartwig H. Kremer | 2009 | GAIA |
| 17 | Nature conservation for future sustainable shorelines: Lessons from seeking to involve the public | Jessica Milligan<br>Tim O'Riordan<br>Sophie A. Nicholson-Cole<br>Andrew R. Watkinson | 2009 | Land Use Policy |
| 18 | Towards climate adaptation and coastal governance in Ireland: Integrated architecture for effective management? | Maria Falaleeva<br>Cathal O'Mahony<br>Stefan Gray<br>Margaret Desmond<br>Jeremy Gault<br>Valerie Cummins | 2011 | Marine Policy |
| 19 | Sea level rise, coastal development and planned retreat: analytical framework, governance principles and an Australian case study | Nick Abel<br>Russell Gorddard<br>Ben Harman<br>Anne Leitch<br>Jennifer Langridge<br>Anthony Ryan<br>Sonja Heyenga | 2011 | Environmental Science & Policy |
| 20 | Wetland conservation and sustainable coastal governance in Japan and England | Stephen Fletcher<br>Midori Kawabe<br>Sonja Rewhorn | 2011 | Marine Pollution Bulletin |

| ID | TITLE | AUTHORS | YEAR | JOURNAL |
|---|---|---|---|---|
| 21 | Social cultural influences on current and future coastal governance | Carolyn Hofmeester<br>Brian Bishop<br>Laura Stocker<br>Geoff Syme | 2012 | Futures |
| 22 | Integrating the science education nexus into coastal governance: A Mediterranean and Black Sea case study | Christopher House<br>Michael R. Phillips | 2012 | Marine Policy |
| 23 | Integrated coastal zone management under authoritarian rule: An evaluation framework of coastal governance in Egypt | Laura Tabet<br>Lucia Fanning | 2012 | Ocean & Coastal Management |
| 24 | Enhancing the knowledge governance interface: Coasts, climate and collaboration | Beverley Clarke<br>Laura Stocker<br>Brian Coffey<br>Peat Leith<br>Nick Harvey<br>Claudia Baldwin<br>Tom Baxter<br>Gonni Bruekers<br>Chiara Danese Galano<br>Meg Good<br>Marcus Haward<br>Carolyn Hofmeester<br>Debora Martins De Freitas<br>Taryn Mumford<br>Melissa Nursey-Bray<br>Lorne Kriwoken<br>Jenny Shaw<br>Janette Shaw<br>Tim Smith<br>Dana Thomsen<br>David Wood<br>Toni Cannard | 2013 | Ocean & Coastal Management |
| 25 | Coastal Innovation Imperative | Bruce C. Glavovic | 2013 | Sustainability |
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| 36 | The Difficulties of Designing Future Coastlines in the Face of Climate Change | Timothy O'Riordan<br>Carla Gomes<br>Luísa Schmidt | 2014 | Landscape Research |
| 37 | Towards integrated coastal governance with Chinese characteristics e A preliminary analysis of China's coastal and ocean governance with special reference to the ICM practice in Quanzhou | Hao Kong<br>Xiongzhi Xue<br>Zhu Mao<br>Suinyuy Derrick Ngoran<br>Wei Yang | 2015 | Ocean & Coastal Management |
| 38 | Design and evaluation of marine and coastal governance indicators for the Southern Mexican region | Isaac Azuz-Adeath<br>César García-Gutiérrez<br>Humberto Alonso-Peinado<br>Carlos Torres-Navarrete<br>Salomón Díaz-Mondragón | 2015 | Journal of Integrated Coastal Zone Management |
| 39 | Improving ocean and coastal governance in Trinidad and Tobago e Moving towards ICZM | Kahlil Hassanali | 2015 | Ocean & Coastal Management |
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| 66 | Using a resilience thinking approach to improve coastal governance responses to complexity and uncertainty: a Tasmanian case study, Australia | Javad Jozaei<br>Michael Mitchell<br>Sarah Clement | 2020 | Journal of Environmental Management |
| 67 | Building resilience to natural hazards through coastal governance: a case study of Hurricane Harvey recovery in Gulf of Mexico communities | Kelly Heber Dunning | 2020 | Ecological Economics |
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| 71 | Regional public policy for Integrated Coastal Zone Management in Central America | Veronica Caviedes<br>Pedro Arenas-Granados<br>Juan Manuel Barragan-Munoz | 2020 | Ocean and Costal Management |
| 72 | Ecosystem accounting's potential to support coastal and marine governance | Wenting Chen<br>Kristof Albert M. Van Assche<br>Stephen Hynes<br>Trine Bekkby<br>Hartvig C. Christie<br>Hege Gundersen | 2020 | Marine Policy |
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| 74 | Integrating climate change adaptation in coastal governance of the Barcelona metropolitan area | Inga J. Sauer<br>Elisabet Roca<br>Míriam Villares | 2021 | Mitigation and Adaptation Strategies for Global Change |
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| 78 | The 'wickedness' of governing land subsidence: Policy perspectives from urban Southeast Asia | Rapti Siriwardane-de Zoysa<br>Tilo Schöne<br>Johannes Herbeck<br>Julia Illigner<br>Mahmud Haghighi<br>Hendricus Simarmata<br>Emma Porio<br>Alessio Rovere<br>Anna-Katharina Hornidge | 2021 | Plos One |
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## 1b: Coastal landscape governance database

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| 2 | Governing the landscape: potential and challenges of integrated approaches to landscape sustainability in Indonesia | Rebecca Anne Riggs<br>Ramadhani Achdiawan<br>Ani Adiwinata<br>Agni Klintuni Boedhihartono<br>Agustinus Kastanya<br>James Douglas Langston<br>Hari Priyadi<br>Manuel Ruiz-Pérez<br>Jeffrey Sayer<br>Albertus Tjiu | 2021 | Landscape Ecology |
| 3 | Landscape Governance and Sustainable Land Restoration: Evidence from Shinyanga, Tanzania | Judith Nzyoka<br>Peter A. Minang<br>Priscilla Wainaina<br>Lalisa Duguma<br>Lucas Manda<br>Emmanuel Temu | 2021 | Sustainability |
| 4 | Urban versus Rural? Conflict Lines in Land Use Disputes in the Urban–Rural Fringe Region of Schwerin, German | Meike Fienitz<br>Rosemarie Siebert | 2021 | Land |
| 5 | Mind the Gap: Why the Landscape Planning System in Sardinia Does Not Work | Anna Maria Colavitti<br>Alessio Floris<br>Sergio Serra | 2021 | Sustainability |
| 6 | Spatial Tools for Integrated and Inclusive Landscape Governance: Toward a New Research Agenda | Mirjam Ros-Tonen<br>Louise Willemen<br>Michael McCall | 2021 | Environmental Management |
| 7 | Toward Inclusive Landscape Governance in Contested Landscapes: Exploring the Contribution of Participatory Tools in the Upper Suriname River Basin | Lisa Best<br>Kimberley Fung-Loy<br>Nafieda Ilahibaks<br>Sara Ramirez-Gomez<br>Erika N. Speelman | 2021 | Environmental Management |
| 8 | Collaborative governance for coastal landscape integrated management: The agro pontino coast contract | Stefano Magaudda<br>Serena Muccitelli<br>Carolina Pozzi<br>Cristina Palazzini | 2021 | Sustainable Mediterranean Construction |
| 9 | Making maps, making claims: the politics and practices of visualisation in environmental governance | Synne Movik<br>Tor A. Benjaminsen<br>Tim Richardson | 2021 | Landscape Research |

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| 10 | Capable to govern landscape restoration? Exploring landscape governance capabilities, based on literature and stakeholder perceptions | Cora van Oosten<br>Hens Runhaar<br>Bas Arts | 2021 | Land Use Policy |
| 11 | Making landscapes of (be)longing. Territorialization in the context of the EU development program leader in North Rhine-Westphalia | Muller, O. | 2021 | European Countryside |
| 12 | Diverse interpretations of governance and their relevance to forest landscape restoration | Stephanie Mansourian<br>Anne Sgard | 2021 | Land Use Policy |
| 13 | A Geoethical Approach to Unlock a Social-Ecological Governance Problem: The Case of the Tordera River. (Catalonia, Spain) | Francesc Bellaubi<br>Josep Maria Mallarach<br>Rafael Sardá | 2021 | Sustainability |
| 14 | Landscape sustainability science (II): core questions and key approaches | Jianguo Wu | 2021 | Landscape ecology |
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| 16 | Integrated landscape approaches in the tropics: A brief stock-take | James Reed<br>Amy Ickowitz<br>Colas Chervier<br>Houria Djoudi<br>Kaala Moombe<br>Mirjam Ros-Tonen<br>Malaika Yanou<br>Linda Yuliani<br>Terry Sunderland | 2020 | Land Use Policy |
| 17 | Landscape governance through partnerships: lessons from Amboseli, Kenya | Tabitha Mugo<br>Ingrid Visseren-Hamakers<br>Rene van der Duim | 2020 | Journal of Sustainable Tourism |
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| 19 | Landscape strategy making as a pathway to policy integration and involvement of stakeholders: examples from a Danish action research programme | Lone Søderkvist Kristensen<br>Jørgen Primdahl | 2020 | Journal of Environmental Planning and Management |
| 20 | Virtual Parceling | Karen Bradshaw<br>Bryan Leonard | 2020 | International Journal of the Commons |
| 21 | Commodity-Centric Landscape Governance as a Double-Edged Sword: The Case of Soy and the Cerrado Working Group in Brazil | Mairon G. Bastos Lima<br>U. Martin Persson | 2020 | Frontiers in Forests and Global Change |
| 22 | Landscape Approach towards Integrated Conservation and Use of Primeval Forests: The Transboundary Kovda River Catchment in Russia and Finland | Per Angelstam<br>Michael Manton<br>Taras Yamelynets<br>23Ole Jakob Sørensen<br>Svetlana V. Kondrateva (Stepanova) | 2020 | Land |
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| 37 | The impact of European landscape transitions on the provision of landscape services: an explorative study using six cases of rural land change | Theo Van der Sluis | 2019 | Landscape Ecology |
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| 49 | Top-down, Bottom-up and Sideways: The Multilayered Complexities of Multi-level Actors Shaping Forest Governance and REDD+ Arrangements in Madre de Dios, Peru | Dawn Rodriguez-Ward<br>Anne M. Larson<br>Harold Gordillo Ruesta | 2018 | Environmental Management |
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| 67 | Exploring ecosystem-change and society through a landscape lens: recent progress in European landscape research | Tobias Plieninger<br>Thanasis Kizos<br>Claudia Bieling<br>Laurence Le Dû-Blayo<br>Marie-Alice Budniok<br>Matthias Bürgi<br>Carole L. Crumley<br>Geneviève Girod<br>Pip Howard<br>Jan Kolen<br>Tobias Kuemmerle<br>Grega Milcinski<br>68Hannes Palang<br>Kathrin Trommler<br>Peter H. Verburg | 2015 | Ecology & Society |
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| 69 | Assessing the contribution of ecosystem services to human wellbeing: A disaggregated study in western Rwanda | Neil Dawson<br>AdrianMartin | 2015 | Ecological Economics |

| ID | TITLE | AUTHORS | YEAR | JOURNAL |
|---|---|---|---|---|
| 70 | Landscapes of Social Inclusion: Inclusive Value-Chain Collaboration Through the Lenses of Food Sovereignty and Landscape Governance | Mirjam A.F. Ros-Tonen<br>Yves-Pierre Benoît Van Leynseele<br>Anna Laven<br>Terry Sunderland | 2015 | European Journal of Development Research |
| 71 | Conservation tourism and landscape governance in Kenya: the interdependency of three conservation NGOs | Arjaan Pellis<br>Machiel Lamers<br>René Van der Duim | 2015 | Journal of Ecotourism |
| 72 | Preparing the ground for better landscape governance: gendered realities in southern Sulawesi | Carol J. Pierce Colfer<br>Ramadhani Achdiawan<br>Hasantoha Adnan<br>Moira Moeliono<br>Agus Mulyana<br>Elok Mulyoutami<br>James M. Roshetko<br>E. Linda Yuliani<br>Balang<br>LepMil | 2015 | Forests, Trees and Livelihoods |
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| ID | TITLE | AUTHORS | YEAR | JOURNAL |
|---|---|---|---|---|
| 82 | A model of the science–practice–policy interface in participatory land-use planning: lessons from Laos | Jean-Christophe Castella<br>Jeremy Bourgoin<br>Guillaume Lestrelin<br>Bounthanom Bouahom | 2014 | Landscape Ecology in Practice |
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| 84 | Forest Landscape Restoration: Who Decides? A Governance Approach to Forest Landscape Restoration | Cora van Oosten | 2013 | Brazilian Journal of Nature Conservation |
| 85 | Resource Use Conflicts and Urban–Rural Resource Use Dynamics in Swedish Coastal Landscapes: Comparison and Synthesis | Olga Stepanova<br>Karl Bruckmeier | 2013 | Journal of Environmental Policy & Planning |
| 86 | From climate-smart agriculture to climate-smart landscapes | Sara J Scherr<br>Seth Shames<br>Rachel Friedman | 2012 | Agriculture & Food Security |
| 87 | Sustainable landscape governance: Lessons from a catchment based study in whole landscape design | Adrian Southern<br>Andrew Lovett<br>Tim O'Riordan<br>Andrew Watkinson | 2011 | Landscape and Urban Planning |
| 88 | Beyond the conventional: Meeting the challenges of landscape governance within the European Landscape Convention? | Alister Scott | 2011 | Journal of Environmental Management |
| 89 | When landscape planning becomes landscape governance, what happens to the science? | Raoul Beunen<br>Paul Opdam | 2011 | Landscape and urban planning |
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| 91 | Multi-Stakeholder Collaboration in Russian and Swedish Model Forest Initiatives: Adaptive Governance Toward Sustainable Forest Management? | Marine Elbakidze<br>Per K. Angelstam<br>Camilla Sandström<br>Robert Axelsson | 2010 | Understanding Adaptive Capacity in Forest Governance |
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| 95 | Landscape governance . The "politics of scale" and the "natural" conditions of places | Christoph Görg | 2007 | Geoforum |

# Appendix 2 – A brief description of each coastal planning institution developed in the Northern Region of Portugal since 1978

### Study - Landscape Recognition of the Coastal Zone between Caminha and Cortegaça (1977–78)

The LRCZCC 77/78, created by landscape architect Ilídio de Araújo twenty years before the 1998 establishment of the Portuguese planning system with Law 48/98, was developed during a period of limited and fragmented legislation that did not specifically address coastal planning (see Gonçalves and Pinho (2024a) for a detailed history of the Portuguese planning system).

Between 1950 and 1974, Portugal experienced heightened regional inequalities due to increased internal migration to coastal areas and major cities, alongside external emigration, marking the start of the European coastalisation process in the country. At that time, Ilídio de Araújo, working at the Directorate-General for Urbanisation Services – North Region, initiated the LRCZCC 77/78 to map and identify the landscape values between Caminha and Cortegaça. The study, which consists of five volumes, initially focused on a narrow critical strip of 1 km in width, under intense urban pressure and facing uncontrolled industrial and tourist developments. However, recognising that the adoption of landscape protection measures would likely shift activities to the immediately adjacent inland area, the scope of the study was expanded to a 3km buffer. According to the study, these developments "*threaten to destroy its extraordinary and irreplaceable social value (including recreational, cultural, tourist, and occasionally agricultural functions) and turn it into a monstrous and disfigured continuous urban sprawl, stretching for hundreds of kilometers, embodying a kind of "underworld" or "subutopia," as some have suggested, in stark contrast to Thomas More's concept of Utopia"* (de Araújo, 1978).

Even though Ilídio de Araújo described the project as a mere mapping of landscape values, he ultimately produced a chapter and maps of landscape protection and management (Figure 40) in two of the five volumes (Volume I – from Minho to Lima and Volume V – Douro to Cortegaça), which served as a foundation for replicating his approach in the remaining volumes.

Despite its incomplete status, this early study is significant for its landscape perspective on the coastal zone, making it relevant for understanding the integration of the landscape concept into the evolution of coastal planning. Its regional scale and methodological approach are also comparable to those used in later coastal management plans. Additionally, the LRCZCC 77/78 thus serves as a reference point for comparing and understanding subsequent changes in the coastal landscape in the three case studies.

**Figure 1** Example of a Landscape Planning/Protection Map in Volume I produced by de Araújo (1978)

## 2. Coastal Zone Management Plan Caminha-Espinho 1999

In 1993, the Portuguese Government recognised the Portuguese coastline and coastal zone as crucial natural resources, characterised by high environmental sensitivity and supporting various economic activities (Veloso-Gomes & Taveira-Pinto, 2003b). In response, Decree-Law n.º. 309/93 established the Coastal Management Plans (POOCs) to regulate these areas. The POOCs encompass both the Public Maritime Domain and a terrestrial protection zone extending up to 500 meters inland as well as extending to the -30 meter bathymetric line. Port areas were excluded from the POOC intervention area. The Public Maritime Domain is a land corridor from the bathymetric depth of −30 m to 50 m, calculated from the Medium Sea Overflow, and these lands belong to the State Public Domain (Pinho, 2007a).

Portugal's mainland was divided into nine sectors for planning purposes, one of which included the area between Caminha and Espinho. This sectoral plan was approved in 1999 by the Resolution of the Council of Ministers n.º. 25/99. The main objectives of POOC-CE 1999 were to organise coastal uses and activities, classify and regulate beach use, enhance and improve strategic beaches for environmental or tourism purposes, guide specific coastal activities, and ensure the protection and conservation of nature.

Also, in 1999, the legal framework for territorial management instruments, established by Decree-Law n.º 380/99, recognised the POOC at the top of the hierarchy as a Special Plan. As a Special Plan, the rules established by POOCs take precedence over other planning documents or regulations that may apply to the same areas, including Municipal Director Plans (Figure 2).

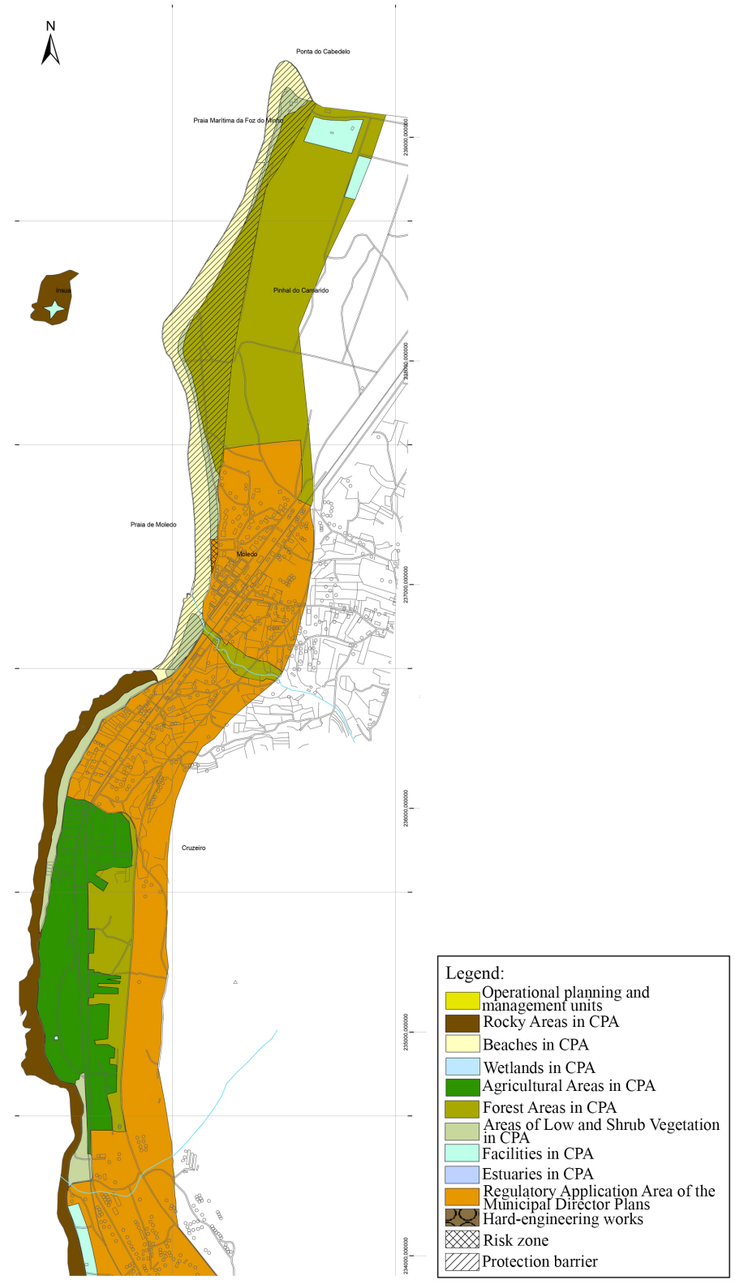


**Figure 2** Extract of a Synthesis Map of the POOC-CE 1999 (Adapted from: https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POOC/Caminha-Espinho/plantasntese1.pdf)

## 3. Coastal Zone Management Plan Caminha-Espinho 2007

In 2007, the POOC-CE 1999 was amended because, during its implementation, it became evident that the number and conditions of beach support facilities were insufficient to meet local demand (Figure 3). The amendments specifically targeted the beach plans within the overall framework, so this updated version was excluded from the content analysis because its strategy and the territorial model remained unchanged.

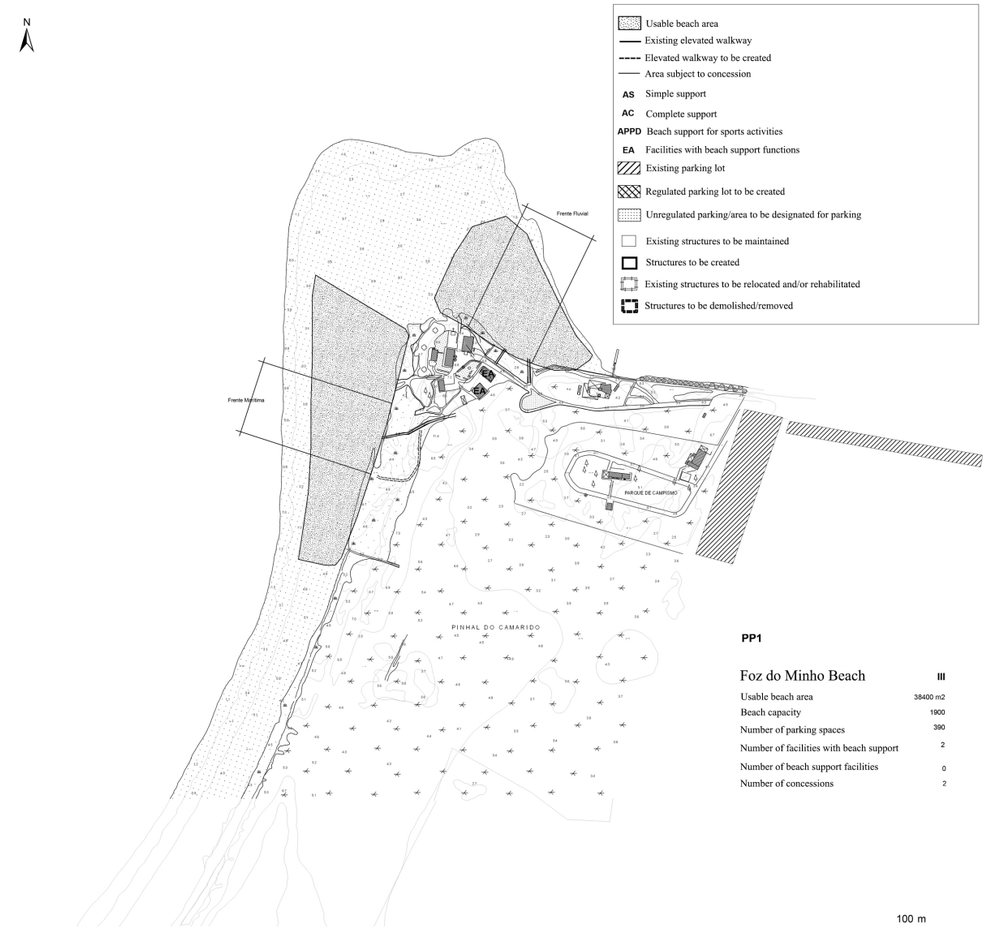


**Figure 3** Example of a Beach Plan (Adapted from: https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POOC/Caminha-Espinho/planosPraia_FozMinho.pdf)



## 4. Coastal Zone Management Program Caminha-Espinho 2021

In 2012, eighteen years after the approval of Decree-Law n.º 309/93, which established the rules for POOCs, the Government introduced Decree-Law n.º 159/2012. This legislation aimed to incorporate contemporary European and national legislative trends, including the Water Law (Law n.º. 58/2005), which transposed the European Commission's Water Framework Directive, and the National Strategy for Integrated Coastal Zone Management, approved by the Resolution of the Council of Ministers 82/2009 (Veloso-Gomes et al., 2008b). The enactment of this decree was particularly timely, as it coincided with the scheduled review period for the majority of the existing POOCs. Indeed, in 2009, the Secretary of State for Spatial Planning and Cities mandated the revision of the POOC-CE through the 'Order n.º 22401/2009'. However, this revision did not occur until several years later.

The new legal framework acknowledged the necessity for integrated and adaptive management of coastal zones, specifying that harbour jurisdiction areas must be included in Coastal Zone Management Plans. It also allowed for the extension of the terrestrial protection zone up to 1000 meters to safeguard coastal biophysical systems situated beyond the existing 500-meter coastal strip. Additionally, the Decree-Law clarified that POOCs could encompass territorial and transitional waters while ensuring compliance with the regulations outlined in the estuary management plans, which were intended to be developed at that time. Despite this, as of 2024, these estuary management plans have yet to be completed.

Furthermore, following the publication of Decree-Law n.º. 159/2012, the POOC-CE was reviewed only 22 years after its initial publication and 12 years beyond its initially scheduled deadline (10 years). A significant legislative development occurred in 2014 with the enactment of a new Spatial Planning Law (Law n.º 31/2014 and Decree-Law n.º 80/2015), which redefined Coastal Zone Management Plans as Coastal Zone Management Programmes (POC). This redefinition as a Special Programme adopted a strategic role, meaning that while the State retains the authority to establish the overarching strategy for coastal zones. However, regulations affecting private rights and citizens can only be enforced through Municipal Director Plans. The POC can no longer regulate land use, occupation and transformation (Figure 4). This shift minimises the influence of Coastal Zone Management Programmes and reinforces the role of municipal spatial planning. Appendix 5 presents a comparison of the legal documents required for the POOC-CE and POC-CE approval.

The POC-CE was published through the Resolution of the Council of Ministers n.º 111/2021. It established the following coastal planning vision: "*A resilient, developed, and sustainable coastal zone, supported by an integrated and adaptive management model, which balances coastal protection with the safeguarding of people and property, ensures the preservation of natural, cultural, and landscape heritage, and promotes the economic utilisation and enhancement of territorial resources*".

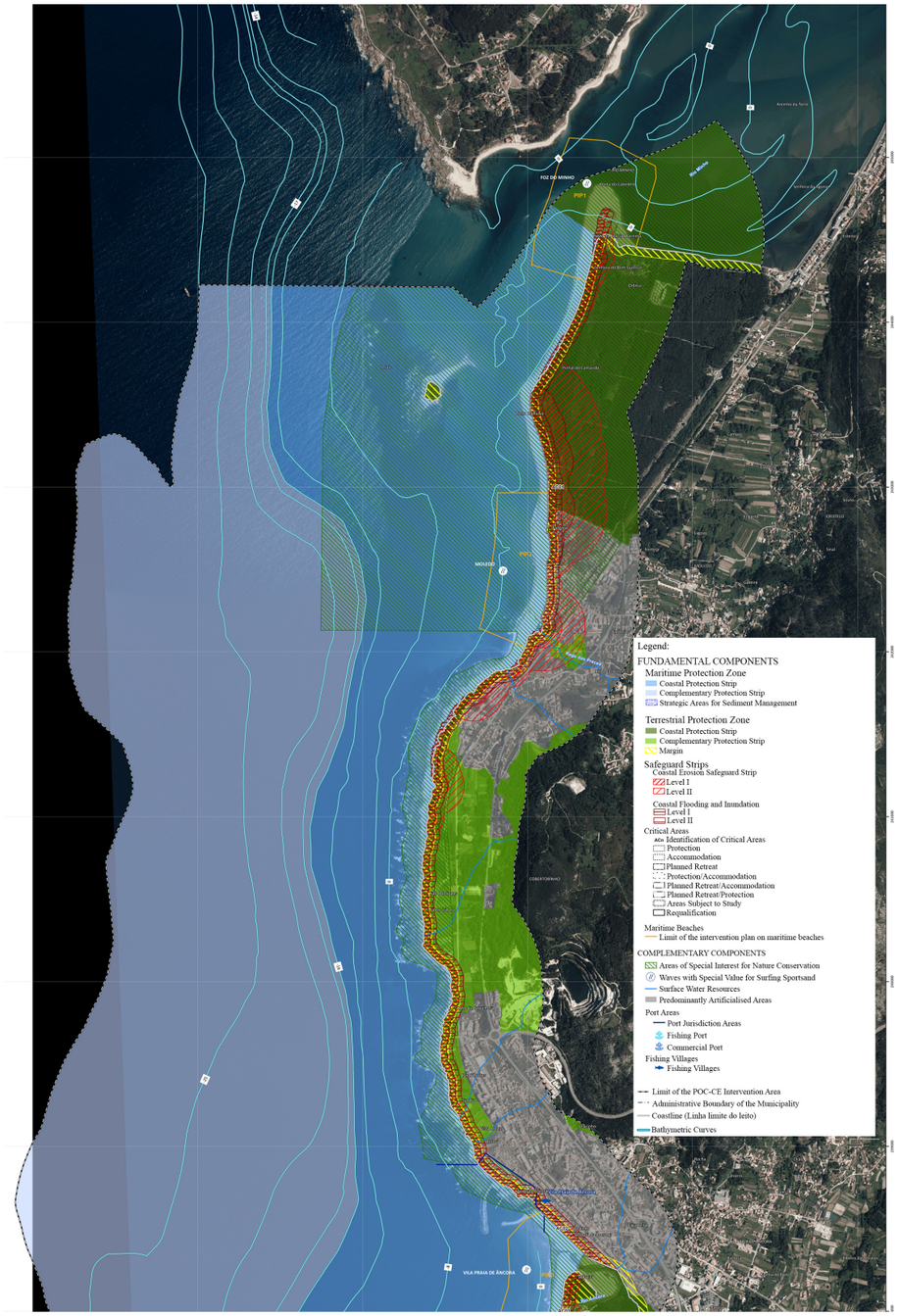


**Figure 4** Extract of a Territorial Model Map of the POC-CE 2021 (Adapted from: https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/Modelo%20Territorial/2021_01_31_TXXI_POC_MT-01_ortos2015.pdf)

# Appendix 3 – Adaptation of the Hersperger et al. (2020) Protocol based on Runhaar et al., (2024), Bürgi et al., (2022), Simensen et al., (2018), and Nogué et al. (2016)

**Legend** New information / Adapted information / Excluded information / No changes

**Table 1** Adaptation of the Hersperger et al. (2020) protocol based on Runhaar et al., (2024), Bürgi et al., (2022), Simensen et al., (2018), and Nogué et al. (2016)

| **Original protocol by Hersperger et al., (2020)** | | | | **Adapted protocol of Hersperger et al., (2020) based on Runhaar et al., (2024), Bürgi et al., (2022), Simensen et al., (2018), and Nogué et al. (2016)** | | |
|---|---|---|---|---|---|---|
| **Item** | **Justification** | **Coding** | | **Item** | **Justification** | **Coding** |
| 0. Explicit use of the word "Landscape" | | | | 0. Explicit use of the world "Landscape" (Paisagem, in Portuguese) | | |
| Year of plan approval | Not provided | year | | 01. When was the plan developed or approved?* | Knowing the exact timeframe of the plan's approval is critical for understanding the context in which the plan was created. By identifying when the plan was developed or approved, we can evaluate whether it aligns with contemporary landscape discussions, especially following the adoption of the Council of Europe Landscape Convention, or if it adheres to paradigms that were current at the time of its development. | Year |
| How often do the documents contain the word "landscape"? | Not provided | a) never<br>b) seldom<br>c) often<br>d) exact count | | 02. How often does the plan contain the word landscape (paisag*)?** | By quantifying the occurrence of the word' landscape,' we can estimate the plan's commitment to addressing landscape concerns. The frequency of the term can reflect the importance of landscape in the development of the plan. | exact count |
| 1. Plans take advantage of the integrative power of landscapes | | | | 1. How has the CONCEPTUALISATION of landscape ("paisagem") in Portuguese coastal planning instruments evolved since 1978? | | |
| Thematic context | This assessment indicates whether landscape is perceived in broad or limited thematic contexts within the urban region. | a) Green infrastructure<br>b) Cultural heritage and historic landscapes<br>c) Tourism and recreation<br>d) Nature conservation<br>e) Agriculture/farming<br>f) Biodiversity<br>g) Water management<br>h) Sustainability/ sustainable development<br>i) [landscape] aesthetics<br>j) Urban containment<br>k) Forestry<br>l) Place branding (high quality of life, positioning)<br>m) Resilience | | Not included as we considered that this topic is discussed in the new questions related to "Inclusiveness" | | |

| Original protocol by Hersperger et al., (2020) | | | | Adapted protocol of Hersperger et al., (2020) based on Runhaar et al., (2024), Bürgi et al., (2022), Simensen et al., (2018), and Nogué et al. (2016) | | |
|---|---|---|---|---|---|---|
| **Item** | **Justification** | **Coding** | | **Item** | **Justification** | **Coding** |
| Inclusiveness | Potential perspectives of landscape are biophysical, socio-cultural, aesthetic and holistic (encompassing all three mentioned perspectives). A holistic perspective is thus inclusive; the consideration of only one perspective is least inclusive | a) Biophysical<br>b) Socio-cultural<br>c) Aesthetic<br>d) Holistic | | Inclusiveness [adapted]<br>03. Does the plan define the concept of landscape? | This question serves as a foundational inquiry to determine the plan's approach to and understanding of the landscape. | a) Yes<br>b) No, move to the next question |
| | | | | 04. Which conceptualisation of landscape is used? | This question aims to understand the perspective of the landscape adopted in the plan, which is crucial as it determines the inclusiveness of considerations within the decision-making process. A holistic perspective, which integrates biophysical, socio-cultural, and aesthetic aspects of landscape, promotes comprehensive and balanced planning. In contrast, focusing solely on one perspective—whether biophysical, socio-cultural, or aesthetic—may limit the plan's ability to address the diverse needs and values associated with landscapes. | a) Biophysical<br>b) Socio-cultural<br>c) Aesthetic<br>d) Holistic |
| | | | | 05. If the plan does not define 'landscape,' is it possible to identify the conceptualisation that is used in its development? | This question aims to explore if, even in the absence of an explicit definition of the landscape, it is feasible through contextual analysis of its content to determine its conceptualisation. | a) Biophysical<br>b) Socio-cultural<br>c) Aesthetic<br>d) Holistic<br>e) Not possible |
| | | | | 06. Does the plan identify the boundaries of the coastal landscape? | This question aims to understand whether the plan adopts political-administrative boundaries or takes advantage of the integrative power of the conceptualisation of landscape. | a) Yes, the plan identifies its boundaries from a landscape perspective<br>b) No, the plan uses political-administrative boundaries or buffer zones |
| | | | | 07. Does the plan identify coastal landscape types and/or coastal landscape character areas in its intervention area? | The identification of landscape types and/or coastal landscape character areas is typically aligned with a scientific perspective of the concept of landscape. This question aims to determine if the identification of these elements aligns with the perspective used in the plan's development (Simensen et al., 2018). | a) Yes<br>b) No |
| | | | | 08. Does the plan consider all coastal landscapes equally relevant? | This question seeks to determine whether the plan scope considers all landscapes as relevant or if it focuses only on parts of the landscape, such as outstanding natural or cultural landscapes or specific types of landscapes. | a) Yes, the plan considers all landscapes relevant<br>b) No, the plan explicitly considers only part of the landscape relevant<br>c) No, the plan does not mention it |

| Original protocol by Hersperger et al., (2020) | | | | Adapted protocol of Hersperger et al., (2020) based on Runhaar et al., (2024), Bürgi et al., (2022), Simensen et al., (2018), and Nogué et al. (2016) | | |
|---|---|---|---|---|---|---|
| **Item** | **Justification** | **Coding** | | **Item** | **Justification** | **Coding** |
| Multiple stakeholder engagement in the landscape system | The European Landscape Convention (ELC) emphasises the importance of multiple stakeholders in the definition and implementation of landscape policies. Different stakeholders have different values and thus multiple stakeholder engagement can frame and express goals for landscape development in different ways, stimulate complementarity in conservation activities and increase the sense of belonging | a) General addressed for the entire plan<br>b) Explicitly linked to landscape<br>c) Not addressed at all | | 09. Does the plan involve multiple actors in its development? | The European Landscape Convention (ELC) emphasises the importance of multiple stakeholders in the definition and implementation of landscape policies. Different stakeholders have different values, and thus, multiple stakeholder engagement can frame and express goals for landscape development in different ways, stimulate complementarity in conservation activities and increase the sense of belonging | a) Yes, multiple actors are involved, discussing a landscape vision<br>b) Yes, multiple actors are involved, but without a focus on the landscape<br>c) Only mandatory state actors are involved<br>d) Not addressed at all |
| Participatory monitoring | To facilitate shared learning and adaptive planning, landscape-monitoring information needs to be widely accessible. Information collected in participative processes ideally supplements the data collected by government entities. | a) General addressed for the entire plan<br>b) Explicitly linked to landscape<br>c) Not addressed at all | | 10. Does the plan establish a participatory landscape-monitoring information system that is widely accessible? | To facilitate shared learning and adaptive planning, landscape-monitoring information needs to be widely accessible. Information collected in participative processes ideally supplements the data collected by government entities. | a) Yes, the plan establishes a participatory landscape-monitoring information system that is widely accessible to actors and to the local community<br>b) Yes, but the accessibility of the participatory landscape-monitoring information system is limited to certain actors<br>c) No, the plan does not establish a participatory landscape-monitoring information system<br>d) No, the plan does not establish a landscape-monitoring information system at all |
| Strengthening the capacity of stakeholders | Landscape inhabitants require the ability to participate effectively in the planning and management of their region that requires skills and events for participation at the landscape scale | a) General addressed for the entire plan<br>b) Explicitly linked to landscape<br>c) Not addressed at all | | 11. Does the plan effectively involve the participation of local communities? | Landscape inhabitants need the ability to participate effectively in the planning and management of their region, which necessitates developing skills and organising events that facilitate participation at the landscape scale | a) Yes, local communities are actively engaged throughout the planning process<br>b) Yes, local communities have been consulted at key stages of the planning process<br>c) No, local community participation is minimal or not effectively integrated<br>d) Not addressed in the plan |

| Original protocol by Hersperger et al., (2020) | | | | Adapted protocol of Hersperger et al., (2020) based on Runhaar et al., (2024), Bürgi et al., (2022), Simensen et al., (2018), and Nogué et al. (2016) | | |
|---|---|---|---|---|---|---|
| **Item** | **Justification** | **Coding** | | **Item** | **Justification** | **Coding** |
| Adaptive management | Landscape processes are dynamic and adaptive management is a means to adapt to these changing conditions. Adaptive management enables people to learn from the outcomes of management strategies and thus improve future planning. | a) General addressed for the entire plan<br>b) Explicitly linked to landscape<br>c) Not addressed at all | | 12. Does the plan incorporate adaptive management practices that facilitate learning from outcomes and adjusting based on changes in the coastal landscape? | Landscape processes are dynamic, and adaptive management is a means of adapting to these changing conditions. Adaptive management enables people to learn from the outcomes of management strategies and thus improve future planning. | a) Yes, the plan includes adaptive management practices that allow for ongoing learning and adjustments based on changes in the coastal landscape<br>b) Partially, the plan includes some elements of adaptive management, but it lacks comprehensive mechanisms for learning from outcomes and adjusting based on coastal landscape changes<br>c) No, the plan does not incorporate adaptive management practices for learning from outcomes or making adjustments based on coastal landscape changes |
| 2. Plans are based on knowledge on landscape functioning | | | | 2. How has the INTEGRATION of landscape ("paisagem") in Portuguese coastal planning instruments evolved since 1978? | | |
| | | | | 2.1. Integration Based on Knowledge of Landscape Functioning | | |
| Multifunctionality | Multifunctionality is a complex concept which refers to the fact that one particular area can serve several purposes or that an area can be comprised of several smaller areas dedicated to specific uses. Multifunctionality is most clearly expressed through the multiple ecosystem services provided by the landscape, in complex land-use forms and in land-use rights. In general, multifunctionality is often considered as positive. Maintaining or developing multifunctional landscapes can thus be seen as one of many strategies towards sustainable development at the landscape level. | a) In general way<br>b) With specific references regarding problems, goals, tasks<br>c) Not addressed at all | | 13. Does the plan promote landscape multifunctionality? | Multifunctionality is a complex concept which refers to the fact that one particular area can serve several purposes or that an area can be comprised of several smaller areas dedicated to specific uses. Multifunctionality is most clearly expressed through the multiple ecosystem services provided by the landscape, in complex land-use forms and in land-use rights. In general, multifunctionality is often considered as positive. Maintaining or developing multifunctional landscapes can thus be seen as one of many strategies towards sustainable development at the landscape level. | a) Yes, the plan actively promotes landscape multifunctionality as a strategy for its development<br>b) Yes, but the promotion of landscape multifunctionality is limited to certain areas of the plan<br>c) No, not addressed at all |

| Original protocol by Hersperger et al., (2020) | | | | Adapted protocol of Hersperger et al., (2020) based on Runhaar et al., (2024), Bürgi et al., (2022), Simensen et al., (2018), and Nogué et al. (2016) | | |
|---|---|---|---|---|---|---|
| **Item** | **Justification** | **Coding** | | **Item** | **Justification** | **Coding** |
| Multiple scale | Landscape systems are hierarchically structured and scale dependent. The scales to consider are: the spatial scale (the extent or area covered), the temporal scale (i.e. years, decades or centuries) and the institutional scale (i.e. municipalities and regions). Landscape systems are best characterised on multiple scales and can be analysed through a hierarchy of nested scales. | a) In general way<br>b) With specific references regarding problems, goals, tasks<br>c) Not addressed at all | | 14. Does the plan consider multiple scales for its development? | Landscape systems are hierarchically structured and scale-dependent. The scales to consider are the spatial scale (the extent or area covered), the temporal scale (i.e. years, decades or centuries) and the institutional scale (i.e. municipalities and regions). Landscape systems are best characterised on multiple scales and can be analysed through a hierarchy of nested scales. | a) Yes, the plan considers multiple scales (spatial, temporal, and institutional) in its development<br>b) Yes, but the consideration of multiple scales is limited to certain aspects of the plan<br>c) No, not addressed at all |
| System-level resilience | Resilience refers to a system's "capacity for renewal in a dynamic environment" and can be applied to landscape systems. In the context of landscapes, the term resilience is usually used in a positive sense. However, the resilient response of landscapes is not always desirable. | a) In general way<br>b) With specific references regarding problems, goals, tasks<br>c) Not addressed at all | | 15. Does the plan adopt a systems-level resilience? | Resilience refers to a system's "capacity for renewal in a dynamic environment" and can be applied to landscape systems. In the context of landscapes, the term resilience is usually used positively. However, the resilient response of landscapes is not always desirable. | a) Yes, the plan adopts a systems-level approach<br>b) Yes, with specific references regarding problems, goals, tasks<br>c) No, not addressed at all |
| Temporal dynamics | Landscapes change continuously, temporal dynamics are therefore an essential property of landscapes: changes make landscapes. This is also recognised in the formal definition of landscape in the European Landscape Convention. Spatial planning aims to guide the temporal dynamics of landscapes and the resulting spatial patterns in land use. | a) In general way<br>b) With specific references regarding problems, goals, tasks<br>c) Not addressed at all | | 16. Does the plan incorporate an understanding of temporal dynamics, addressing how landscapes change and evolve? | Landscapes change continuously, temporal dynamics are therefore an essential property of landscapes: changes make landscapes. This is also recognised in the formal definition of landscape in the European Landscape Convention. Spatial planning aims to guide the temporal dynamics of landscapes and the resulting spatial patterns in land use. | a) Yes, the plan recognises the evolution and dynamism of landscapes, incorporating adaptive management strategies<br>b) Yes, but the recognition of landscape evolution and dynamism is limited to certain aspects of the plan<br>c) No, the plan does not explicitly recognise the evolution and dynamism of landscapes in its planning or management options |
| Landscape connectivity and fragmentation | Connectivity is a concept in the scientific fields of landscape ecology and conservation biology, which defines the degree to which the landscape facilitates or impedes the movement of species between habitat patches. Fragmentation refers to hampering processes in the landscape, as a result of subdividing spatial units, which may become too small to function properly. | a) In general way<br>b) With specific references regarding problems, goals, tasks<br>c) Not addressed at all | | 17. Does the plan promote landscape connectivity? | Connectivity is a concept in the scientific fields of landscape ecology and conservation biology, which defines the degree to which the landscape facilitates or impedes the movement of species between habitat patches. Fragmentation refers to hampering processes in the landscape, as a result of subdividing spatial units, which may become too small to function properly. | a) Yes, the plan actively promotes landscape connectivity for the entire plan<br>b)Yes, but the promotion of landscape connectivity is limited to certain aspects of the plan<br>c) No, not addressed at all |

| Original protocol by Hersperger et al., (2020) | | | | Adapted protocol of Hersperger et al., (2020) based on Runhaar et al., (2024), Bürgi et al., (2022), Simensen et al., (2018), and Nogué et al. (2016) | | |
|---|---|---|---|---|---|---|
| **Item** | **Justification** | **Coding** | | **Item** | **Justification** | **Coding** |
| Landscape structure | The spatial configuration and composition of land-use are central aspects in the scientific field of landscape ecology. The spatial structure of the landscape interacts continuously with the ecological processes that shape it (Antrop & Van Eetvelde, 2017). | a) In general way<br>b) With specific references regarding problems, goals, tasks<br>c) Not addressed at all | | 18. Does the plan integrate the landscape structure in its development? | The spatial configuration and composition of land-use are central aspects in the scientific field of landscape ecology. The spatial structure of the landscape interacts continuously with the ecological processes that shape it (Antrop & Van Eetvelde, 2017). | A) Yes, the plan addresses the spatial relationship between patches, corridors and the matrix<br>b) Yes, with specific references regarding problems, goals, tasks<br>c) No, not addressed at all |
| | | | | 19. Does the plan identify the driving forces of landscape change? | This question is included to determine whether the plan acknowledges and addresses the underlying factors influencing changes in the landscape. By assessing how comprehensively these driving forces are considered, the question aims to evaluate the plan's ability to address root causes and develop strategies that mitigate negative impacts or harness positive influences on the landscape (Bürgi et al., 2022). | a) Yes, the plan identifies and addresses direct and indirect driving forces influencing landscape change<br>b) Yes, the plan partially addresses some driving forces of landscape change<br>c) No, the plan does not address the driving forces of landscape change |
| | | | | 20. Does the plan identify landscape values? | This question aims to the diversity of landscape values that are recognised in the plan. Evaluating how a plan identifies and addresses different landscape values ensures a comprehensive approach to landscape assessment (Nogué et al., 2016a). | a) Yes, the plan addresses landscape values (natural, aesthetics, historical, social use, symbolics, productive, visual)<br>b) Yes, the plan addresses at least three types of landscape values<br>h) Not addressed at all |
| 3. Plans show the contribution of landscapes to human well-being | | | | 2.2. Integration demonstrating the contribution of landscapes to Human well-being | | |
| Landscape-based recreation | Recreation is one of the key services or values of landscapes in many European regions. Typical landscape related recreational activities are walking, hiking, cycling, picnicking, skiing and water sports | a) In general way<br>b) With specific references regarding problems, goals, tasks<br>c) Not addressed at all | | 21. Does the plan promote landscape-based recreation? | Recreation is one of the key services or values of landscapes in many European regions. Typical landscape related recreational activities are walking, hiking, cycling, picnicking, skiing and water sports | a) Yes, the plan actively promotes landscape-based recreation for the entire plan<br>b) Yes, but the promotion of landscape-based recreation is limited to certain activities or areas<br>c) No, not addressed at all |

| Original protocol by Hersperger et al., (2020) | | | | Adapted protocol of Hersperger et al., (2020) based on Runhaar et al., (2024), Bürgi et al., (2022), Simensen et al., (2018), and Nogué et al. (2016) | | |
|---|---|---|---|---|---|---|
| **Item** | **Justification** | **Coding** | | **Item** | **Justification** | **Coding** |
| Landscape-related cultural heritage | Landscapes are important objects of our society's cultural heritage. They are part of our common heritage and integrate a variety of values, both natural and cultural. | a) In general way<br>b) With specific references regarding problems, goals, tasks<br>c) Not addressed at all | | 22. Does the plan promote the protection and/or enhancement of landscape-related cultural heritage? | Landscapes are important objects of our society's cultural heritage. They are part of our common heritage and integrate a variety of values, both natural and cultural. | a) Yes, the plan actively promotes the protection and/or enhancement of landscape-related cultural heritage<br>b) Yes, but the promotion of landscape-related cultural heritage is limited to certain aspects<br>c) No, not addressed at all |
| Landscape stewardship | Landscape stewardship refers to the care and maintenance of a landscape. People develop a stewardship role for landscapes and thus landscapes contribute to the formation of local cultures whilst providing ecosystem services. Community-based and collaborative landscape initiatives are a manifestation of this stewardship. These initiatives can be diverse; however, their common aim is to maintain the value of landscapes. They can comprise of projects, platforms, initiatives or a set of activities which foster a broad range of landscape values. | a) Nature conservation<br>b) Cultural heritage<br>c) Landscape beauty<br>d) Sense of place, place identity<br>Social well-being<br>e) Rural livelihood<br>f) Regulating services<br>g) Promotion of tourism<br>h) Organic food production, urban agriculture or community gardens | | 23. Does the plan promote landscape stewardship practices? | Landscape stewardship refers to the care and maintenance of a landscape. People develop a stewardship role for landscapes and thus landscapes contribute to the formation of local cultures whilst providing ecosystem services. Community-based and collaborative landscape initiatives are a manifestation of this stewardship. These initiatives can be diverse; however, their common aim is to maintain the value of landscapes. They can comprise of projects, platforms, initiatives or a set of activities which foster a broad range of landscape values. | a) Nature conservation (existing, promoted)<br>b) Cultural heritage (existing, promoted)<br>c) Landscape beauty (existing, promoted)<br>d) Sense of place, place identity Social well-being (existing, promoted)<br>e) Rural livelihood (existing, promoted)<br>f) Regulating services (existing, promoted)<br>g) Promotion of tourism (existing, promoted)<br>h) Organic food production, urban agriculture or community gardens (existing, promoted)<br>i) No reference |
| 4. Plans refer to landscape in all main sections | | | | 2.3. Integration of Landscape in all main sections of plans | | |
| Plan sections referring to landscape | Main sections of a plan are: Introduction, goals, measures. This assessment indicates if the plans regards landscape within the urban region as a background for other activities (introduction), or as a pillar for the development of the urban region (visions and goals), something that should be actively be managed (measures and policy recommendations) and monitored. | a) Introduction<br>b) Visions and goals, key strategic domains<br>c) Measures or policy recommendations<br>d) Monitoring and evaluation | | 24. In which plan section of the landscape included? | Main sections of a plan are: Introduction, goals, measures. This assessment indicates if the plans regards landscape within the urban region as a background for other activities (introduction), or as a pillar for the development of the urban region (visions and goals), something that should be actively be managed (measures and policy recommendations) and monitored. | a) Introduction<br>b) Inventory and analysis of biophysical and socioeconomic processes<br>c) Visions and goals, Key Strategic domains<br>d) Regulatory norms, measures or policy recommendations<br>e) Funding schemes<br>f) Monitoring and evaluation |

# Appendix 4 – List of written and graphical documents assessed in the content analysis for each plan

**Table 2** Written and graphical documents assessed in the content analysis for each plan

| PLAN | LIST OF WRITTEN AND GRAPHICAL DOCUMENTS ASSESSED IN THE CONTENT ANALYSIS | | | SOURCE |
|---|---|---|---|---|
| **LRCZCC 77/78** | Group 01 | Introduction<br>Volume I. Landscape recognition of the coastal zone from Minho to Lima<br>Volume II. Landscape recognition of the coastal zone from Lima to Cávado<br>Volume III. Landscape recognition of the coastal zone from Cávado to Ave<br>Volume IV. Landscape recognition of the coastal zone from Ave to Douro Volume V. Landscape recognition of the coastal zone from Douro to Cortegaça | | Available for in-person consultation at the Forte de Sacavém, SIPA – Information System for Architectural Heritage, Sacavém, Portugal. |
| **POOC-CE 1999** | Group 02 | Baseline Studies, General Report<br>June 1995 | | Private archive of Professor Teresa Andresen |
| | | Preliminary study<br>December 1995 | | |
| | | Preliminary Study - Drawings 1 to 5<br>December 1995<br>01. Quality of the Environment<br>02. Land Use<br>03. Geomorphology<br>04. National Ecological Reserve and National Agricultural Reserve<br>05. Erosion risk | | |
| | | Preliminary Study - Drawings 6 to 11<br>December 1995<br>06. Urban perimeters. Synthesis of the Municipal Director Plans<br>07. Urban Network<br>08. Coastal Protection Area<br>09. Critical Areas<br>10. Synthesis Plan<br>11. Areas of conflict | | |
| | | Preliminary Study - Appendices<br>December 1995 | | |
| | | Fundamental elements, July 1997:<br>Regulation, Synthesis Plan, and Constraints Plan | | |

| PLAN | LIST OF WRITTEN AND GRAPHICAL DOCUMENTS ASSESSED IN THE CONTENT ANALYSIS | | | SOURCE |
|---|---|---|---|---|
| **POOC-CE 1999 (cont.)** | Group 03 | Resolution of the Council of Ministers n.º 25/99, approves the POOC-CE | | https://dre.tretas.org/dre/101191/resolucao-do-conselho-de-ministros-25-99-de-7-de-abril |
| | | Context Plan<br>November 2006* | | https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POOC/Caminha-Espinho/plantaenquadramento.pdf |
| | | Synthesis map 2<br>March 2007* | | https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POOC/Caminha-Espinho/plantasntese2.pdf |
| | | Synthesis map 3<br>March 2007* | | https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POOC/Caminha-Espinho/plantasntese3.pdf |
| | | Synthesis map 4<br>March 2007* | | https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POOC/Caminha-Espinho/plantasntese4.pdf |
| | | Synthesis map 5<br>March 2007* | | https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POOC/Caminha-Espinho/plantasntese5.pdf |
| | | Constraints map 2<br>March 2007* | | https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POOC/Caminha-Espinho/plantacondicionantes2.pdf |
| | | Constraints map 3<br>March 2007* | | https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POOC/Caminha-Espinho/plantacondicionantes3.pdf |
| | | Constraints map 4<br>March 2007* | | https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POOC/Caminha-Espinho/plantacondicionantes4.pdf |
| | | Constraints map 5<br>March 2007* | | https://apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POOC/Caminha-Espinho/plantacondicionantes5.pdf |
| **POC-CE 2021** | Group 04 | Directives<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/POC%20CE_DIRETIVAS.pdf |
| | | Territorial Model, Map 5<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/Modelo%20Territorial/2021_01_31_TXXI_POC_MT-05_ortos2015.pdf |
| | | Territorial Model, Map 6<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/Modelo%20Territorial/2021_01_31_TXXI_POC_MT-06_ortos2015.pdf |
| | | Territorial Model, Map 7<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/Modelo%20Territorial/2021_01_31_TXXI_POC_MT-07_ortos2015.pdf |
| | | Territorial Model, Map 8<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/Modelo%20Territorial/2021_01_31_TXXI_POC_MT-08_ortos2015.pdf |
| | | Territorial Model, Map 9<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/Modelo%20Territorial/2021_01_31_TXXI_POC_MT-09_ortos2015.pdf |
| | | Territorial Model, Map 10<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/Modelo%20Territorial/2021_01_31_TXXI_POC_MT-10_ortos2015.pdf |
| | | Resolution of the Council of Ministers n.º 111/2021, approves the POC-CE | | https://diariodarepublica.pt/dr/detalhe/resolucao-conselho-ministros/111-2021-169418565 |

| PLAN | LIST OF WRITTEN AND GRAPHICAL DOCUMENTS ASSESSED IN THE CONTENT ANALYSIS | | | SOURCE |
|---|---|---|---|---|
| **POC-CE 2021 (cont.)** | Group 05 | Programme Report<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_A-CE/2021-01-29_Relatorio_Programa_VF_compressed.pdf |
| | | Programme Report<br>Appendix 1 - Map of Habitats, Agricultural Areas, and Forest Settlements<br>January 2021 | | https://www.apambiente.pt/agua/programa-da-orla-costeira-caminha-espinho |
| | | Programme Report<br>Appendix 2 - Map of Areas of Special Interest for Nature Conservation and Biodiversity<br>January 2021 | | https://www.apambiente.pt/agua/programa-da-orla-costeira-caminha-espinho |
| | | Programme Report<br>Appendix 4 - Characterisation Sheets for Critical Areas of Protection, Accommodation, and Planned Retreat<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/Relatorio/2021-01_15_Anexo%203_MDFsalv.pdf |
| | | Implementation Program, including the management, protection, conservation, and enhancement measures for water resources and the financing plan<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/4%20POC%20CE_PROGRAMA%20DE%20EXECU%C3%87%C3%83O.pdf |
| | | Environmental Report<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/5%20POC%20CE_RELATORIO%20AMBIENTAL.pdf |
| | | Non-Technical Summary<br>January 2021 | | https://www.apambiente.pt/sites/default/files/_SNIAMB_Agua/DLPC/POC/POC_C-E/Versao_Final_AnexoVI/6%20POC%20CE_RELATORIO%20AMBIENTAL%20RNT.pdf |

# Appendix 5 – Legal documents required for the plan's approval

**Table 3** Legal documents required for the Plans approval

| Plan | List of written and graphical documents legally required | |
|---|---|---|
| | Regulatory | Informative |
| **LRCZCC 77/78** | Not applicable | Not applicable |
| **POOC-CE 1999** | Regulations document | The report, which substantiates the main measures, guidelines, and provisions adopted |
| | The synthesis map, at a scale of 1:25,000, delineating classes and categories of spaces based on dominant use and establishing planning and management operational units | The contextual map, at a scale of 1:10,000, covering the intervention area and the surrounding zone, as well as the main communication routes |
| | The constraints map, at a scale of 1:10,000, indicating administrative easements and public utility restrictions | Implementation programme containing indicative provisions regarding the temporal phasing of major interventions and the estimated cost of planned activities |
| | | Map at a scale of 1:2000 and intervention programme per beach or group of beaches (beach management plans) |
| | | Studies of physical, social, economic, and urban characterisation that substantiate the proposed solution and presented in the form of baseline studies and preliminary studies |
| | | Existing Situation Plan |
| **POC-CE 2021** | Directives | Programme Report |
| | Territorial Model, which presents the graphic territorial representation of the Directives. | Implementation Programme and Financing Plan |
| | | Environmental Report and Non-Technical Summary" |
| | | Qualitative and quantitative indicators to support the evaluation of the Programme |
| | Regulation for the Management of Marine Beaches | Characterisation and diagnostic studies of the intervention area:<br>1. Volume I - Analysis and Evaluation of Preliminary Stakeholder Consultation<br>2. Volume II - Assessment of the Implementation of the POOC Caminha-Espinho<br>3. Volume III - Characterisation and Diagnosis of the Territorial Situation<br>4. Volume IV - Characterisation and Diagnosis of the Reference Situation of Coastal Beaches |
| | Intervention Plans for Marine Beaches | |



# Appendix 6 – Description of the categories and subcategories of the Decree-Law 613/76

**Table 4** Description of the categories and subcategories of the Decree-Law 613/76

| Decree-Law 613/76 - New nature protection regime and creation of national parks | | |
|---|---|---|
| **Categories** | **Subcategories** | **Description** |
| Integral nature reserves and national parks | Integral nature reserves | Where protection concerns all aspects of Nature, preventing any action that alters the dynamics of the respective ecosystems and where human presence is only permitted for administrative or scientific reasons. |
| | National parks | A set of reserves established for the protection of Nature and the education of the population. The national park may contain integral and partial nature reserves surrounded by areas of protection and recreation. The presence of human establishments is only possible under particular conditions and as facilities. |
| Partial nature reserve | Not applicable | Where efforts are made to safeguard certain well-defined aspects of Nature, whether concerning its fauna, flora, soil, geology, or water resources, by taking appropriate measures that allow for their protection, scientific study, and use. Thus, biological, botanical, zoological (ornithological and others), geological, aquatic, and marine nature reserves can be established. |
| Recreation reserve | Not applicable | This corresponds to what has sometimes been referred to as a tourist reserve, as tourism is considered to be the commercialisation of recreation, which is the use of leisure time by workers from any sector.<br><br>In this classification, areas particularly suited to meeting the recreational needs of urban populations, whether active or passive, are considered. These areas emphasise recreational and scenic functions, among others, while still taking into account concerns for the protection of the natural environment and ecological balance. |
| Protected landscape | Not applicable | This corresponds to what has sometimes been referred to as a landscape reserve. The aim is to safeguard rural or urban areas where characteristic aspects of the culture and habits of the people still exist, as well as in constructions and the design of spaces. The continuation of certain activities (agriculture, grazing, handicrafts, etc.) is promoted, supported by controlled recreation aimed at the social, cultural, and economic promotion of the resident populations, in which these populations actively and consciously participate. |

| Decree-Law 613/76 - New nature protection regime and creation of national parks | | |
|---|---|---|
| **Categories** | **Subcategories** | **Description** |
| Classified places, sites, ensembles, and objects | Not applicable | This involves defining areas and measures essential for the landscape conservation of specific natural and/or built occurrences of cultural, scientific, technical, or other interest. These may include villages, rural settlements, archaeological sites, ruins, distinctive landforms, rock formations, isolated or grouped trees, and characteristic ecological communities. |
| Natural Parks | Not applicable | They are areas of territory, properly organised, aimed at recreation, nature conservation, landscape protection, and promotion of rural populations, which may encompass both public and private property, where zoning establishes the capabilities and uses of different land parcels.<br><br>The natural park may encompass one or more areas with the different types previously mentioned, which are integrated into a functional structure with specific regulations included in the overall regulation. |
| Areas that specially ensure the biological balance of the regional landscape | Special Ecological Areas | Areas of high ecological value, both in terms of productivity and the nature and quality of the products, in which the maintenance of fertility and the capacity for renewal of natural resources and which guarantee the biological balance of the regional landscape must be ensured. |
| | Special Agricultural or Forestry Areas | Areas of high agricultural or forestry value, both in terms of the biomass produced and the nature and quality of the products, where the maintenance of fertility should be ensured. They are, therefore, areas where certain agricultural and forestry developments are a priority, and which guarantee the biological balance of the regional landscape. |
| | Degraded Areas to be Rehabilitated | Areas where the soil or vegetation has been destroyed and require special measures for their restoration with a view to utilisation to be determined by national and regional programme. |
| | Underground Reserve Areas | Areas with available resources, minerals or aquifers, in the subsoil, which it is important to safeguard for appropriate use. |



# Appendix 7 – Areas included in the National Ecological Reserve in 1983

**Table 5** Areas included in the National Ecological Reserve in 1983

| National Ecological Reserve (Decree-Law No. 321/83, of July 5th) | |
|---|---|
| **Coastal ecosystems** | Beaches |
| | First and second dunes facing the sea |
| | Cliffs, including a strip up to 200 m inland from their edge |
| | When there are no dunes or cliffs, a strip of 500 m beyond the high-water mark of spring tides |
| | Estuaries and lagoons, including a strip of 100 m beyond the high-water mark of spring tides |
| | Islands, islets, and rocks emerging from the sea along the coast |
| **Inland ecosystems** | Lagoons, including a strip of 100 m beyond the maximum flood limit, including buffer zones |
| | Reservoirs and a strip of 100 m beyond the maximum backwater level |
| | Normal riverbeds, gallery areas, and buffer zones beyond their natural banks |
| | Headwaters of watercourses defined from the ridge line separating rivers and streams to the hydrographic network |
| | Slopes with a gradient exceeding 25% |
| | Cliffs and a surrounding strip of three times their height beyond the base and edge of the cliff |
| | Areas of maximum infiltration defined by their geological nature |
| | Areas abandoned due to severe surface erosion or previous extraction of inert materials |
| | A strip of 100 m beyond the shoulders of highways and expressways, and 50 m beyond the shoulders of other national roads |
| | A strip of 200 m along the entire natural maritime coast, extending seaward from the low-water mark of spring tides |

# Appendix 8 – Categories of the Territorial Model of the POOC-CE 1999

**Table 6** Categories of the Territorial Modelo of the POOC-CE 1999

| Classes and categories | Description |
|---|---|
| Class 1 - Coastal Protection Area (CPA) | The CPA is the portion of territory within the intervention zone of the POOC deemed essential for coastal stability. The aim is to preserve notable or characteristic locations and landscapes of the natural and cultural heritage of the coastal zone, as well as the spaces necessary for maintaining ecological balance, including beaches, rocky areas, dunes, agricultural and forested areas, wetlands, and estuaries.<br><br>In the CPA, changes in land use will be markedly restrictive. These areas should be subject to a public investment programme aimed at enhancing their value and aligning them with recreational opportunities. |
| Category 1.1 - Beaches in CPA | This category includes all beaches as identified on the synthesis plan and the areas of land with the nature of a beach. |
| Category 1.2 - Areas of Low and Shrub Vegetation in CPA | This category includes all areas that predominantly cover the foreshore and dune zones. It also encompasses the Montedor promontory in the municipality of Viana do Castelo, due to its specific characteristics. |
| Category 1.3 - Forest Areas in CPA | The category of forest areas includes spaces composed of mixed forest stands aimed at protection and potentially compatible with production. These areas may or may not be included in the National Agricultural Reserve. |
| Category 1.4 - Agricultural Areas in CPA | This category includes spaces classified in the Municipal Director Plans as areas of the National Agricultural Reserve, as well as areas that, although not included in the National Agricultural Reserve, are predominantly used for agricultural purposes. |
| Category 1.5 - Rocky Areas in CPA | Rocky areas encompass the rocky outcrops along the coastline, including those not connected to the land and those submerged in the sea. |
| Category 1.6 - Wetlands in BCPA | Wetlands are areas that are permanently or temporarily inundated. |
| Category 1.7 - Estuaries in CPA | The following estuarine systems belong to this category:<br><br>a) Minho River Estuary;<br><br>b) Âncora River Estuary;<br><br>c) Cabanas River Estuary;<br><br>d) Lima River Estuary;<br><br>e) Neiva River Estuary;<br><br>f) Cávado River Estuary;<br><br>g) Ave River Estuary;<br><br>h) Onda River Estuary;<br><br>i) Douro River Estuary. |
| Category 1.8 - Facilities in CPA | This category includes areas designated for recreational and leisure facilities, tourism and health services, as well as infrastructure for parking, basic sanitation, and support for fishing and aquaculture. This encompasses related establishments, whether existing or planned in the Municipal Director Plans, that are directly associated with the use and enjoyment of the coastal zone. |
| Class 2 - Regulatory Application Area of the Municipal Director Plans | The regulatory application area of the Municipal Director Plans is the portion of territory within the intervention zone of the POOC that includes spaces classified and defined in these plans as urban areas, developable areas, equipment spaces, and industrial spaces that are contiguous to them.<br><br>This category includes all areas within urban perimeters defined in the Municipal Director Plans where the POOC does not introduce changes to the respective urban parameters.<br><br>From the urban perimeters established in the Municipal Diretor Plans, expansion areas that were considered fundamental for coastal stability due to their use or location have been removed and included in the CPA of the POOC. These areas include:<br><br>a) Zones with high erosion risk;<br><br>b) Buffer zones protecting watercourses;<br><br>c) Built-up areas on the dune cordon;<br><br>d) Areas designated for recreation, sports, and leisure facilities. |
| They are still considered areas subject to specific plans, which constitute operational units for planning and management (UOPG, in Portuguese). | |

| Classes and categories | Description |
|---|---|
| Regardless of the space classes mentioned in the previous sections, specific restriction zones are still delineated on the synthesis map. These zones reflect the impact of coastal erosion on the coastal strip and are designated as: | Protection barrier |
| | Risk zone |



# Appendix 9 – Categories of the Territorial Model of the POC-CE 2021

| FUNDAMENTAL COMPONENTS |
|---|
| 1. Maritime Protection Zone |

**1.1.Coastal Protection Strip**

The Coastal Protection Strip of the Maritime Protection Zone encompasses the maritime area essential for the sustainable use of the coastal zone, limited by the baseline of the seabed and the 16-meter isobath. The depth closure, corresponding to the 16-meter isobath, represents the critical depth value that, in this coastal stretch, separates the coastal domain—characterised by significant cross-shore and longshore sediment transport and notable short-term morphological variability of sandy bottoms—from the maritime zones where the beach profile undergoes no significant changes.

This protection strip, in addition to including key ecosystems of the coastal bio-physical system and hosting important habitats for marine biodiversity protection, such as sandbanks and reefs, plays a crucial role in protecting the adjacent coastline and preserving the suitability of the beaches for recreational activities.

**1.2. Complementary Protection Strip**

The Complementary Protection Strip of the Maritime Protection Zone includes the maritime area adjacent to the Coastal Protection Strip, extending to the 30-meter isobath and covering coastal and territorial waters.

In this component of the Territorial Model, the uses and activities identified in national maritime spatial planning instruments as strategic for development should be promoted. Economic activities conducted in this area must be compatible with the goals of protecting natural resources and values, with particular emphasis on safeguarding marine ecosystems and maintaining coastal physiographic balance.

**1.3. Strategic Areas for Sediment Management**

The Strategic Areas for Sediment Management delineated in the Territorial Model correspond to sediment deposits identified as having the potential to serve as borrow sites for artificial beaches and nearby coastal nourishment. However, studies resulting from the Coastal Working Group Report, the Marine Strategy Framework Directive Monitoring Program, or new national maritime spatial planning instruments may identify additional areas to be included in the integrated sediment management policy.

### 2.1. Coastal Protection Strip

The Coastal Protection Strip of the Terrestrial Protection Zone constitutes the primary interaction zone with the maritime area, where the most representative elements of coastal bio-physical systems are located, including beach-dune systems and associated vegetation formations. This strip plays an essential role in maintaining the balance of the coastal system and preserving the coastline, making it crucial to reconcile various uses and activities of the coastal zone with the vulnerability of coastal bio-physical systems.

Specifically, the Coastal Protection Strip encompasses not only beach-dune systems but also adjacent dune areas that have been artificialised, areas occupied by natural habitats of high conservation interest, the beds and banks of transitional waters, and the final stretches of coastal watercourses.

The Coastal Protection Strip includes a total of 61 natural habitats, primarily representing biotopes such as dunes, estuaries, rocky shores, and forests.

The Territorial Model also identifies a Critical Area for Redevelopment, which corresponds to the areas of the Viana do Castelo Dock located in the bed of the Lima River. There is an urgent need to address the abandonment and degradation of this area through an environmental and urban redevelopment project. It is also important to adapt the water resources management safeguards to prioritise the redevelopment of areas that have been undervalued from an urbanistic perspective.

### 2.2.Complementary Protection Strip

The Complementary Protection Strip of the Terrestrial Protection Zone serves as a buffer zone, with predominantly natural or partially artificialised areas, aimed at protecting the Coastal Protection Strip and/or framing the Predominantly Artificialised Areas.

Together with the Coastal Protection Strip, this area plays a crucial role in achieving the general objectives for the coastal zone defined in policy instruments, including the National Program for Spatial Planning Policy, Regional Spatial Planning Program for the Northern Region, and National Strategy for Integrated Coastal Zone Management, particularly in terms of controlling urbanisation and construction and conserving natural resources and values.



### 2.3. Safeguard Strips

In line with the POC-CE strategy for preventing and reducing coastal risks and vulnerability to climate change and within the framework of an adaptive management model, the Territorial Model identifies Safeguard Strips.

Safeguard Strips define protection regimes aimed at limiting exposure of people and property to risks of erosion, flooding, and coastal inundation. These strips ensure territorial protection against current vulnerabilities and ensure that land use and occupation evolve in harmony with anticipated climate changes and the resulting increase in coastal risk vulnerability.

Safeguard Strips are defined based on the physical characteristics of the coastal zone, the degree of vulnerability of the areas concerned, and the time horizon of exposure. They include two types: the Coastal Erosion Safeguard Strip and the Coastal Flooding and Inundation Safeguard Strip.

The Territorial Model also identifies Critical Areas for Protection, Accommodation, and Planned Retreat, which correspond to areas where the level of susceptibility to coastal risks and the relative importance of exposed elements necessitate priority interventions within the POC-CE risk adaptation strategy. Adaptation strategies for Critical Areas are guided by the principles of protection, accommodation, and planned retreat outlined in the Coastal Working Group Report.

#### 2.3.1. Coastal Erosion Safeguard Strip

The Coastal Erosion Safeguard Strip corresponds to the land area at risk of erosion, reflecting the potential inland migration of the coastline. Its determination is based on the combination of three components: the projection of coastline evolution using historical rates observed over recent decades, the projection of erosion induced by extreme weather events, and the projection of erosion caused by the expected rise in mean sea level. This safeguard strip is divided into two levels of susceptibility corresponding to the following timeframes:

**2.3.1.1. Level I — 2050 timeframe;**

**2.3.1.2. Level II — 2100 timeframe.**

#### 2.3.2. Coastal Flooding and Inundation Safeguard Strip

The Coastal Flooding and Inundation Safeguard Strip corresponds to the land area at risk of ocean-induced flooding or inundation, considering projected increases in mean sea level and the occurrence of extreme meteorological events such as storm surges. This safeguard strip is divided into two levels of susceptibility based on the following timeframes:

**2.3.2.1. Level I — 2050 timeframe;**

**2.3.2.2. Level II — 2100 timeframe.**

| | |
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| | **2.4.1. The Critical Area for Redevelopment** includes urban areas within the Porto de Viana do Castelo that are undervalued and located in water domains. This area requires environmental and urban redevelopment to develop more resilient urban solutions against extreme weather events and flooding, and to enhance the land-water interface. This involves regulating land use in coordination with existing port and fishing activities, adopting construction solutions more resilient to water action, and planning public spaces as multifunctional areas. |
| **2.4. Critical Areas** | **2.4.2. Critical Areas for Protection, Accommodation, and Planned Retreat** are coastal sites or sections highly susceptible to the destruction of coastal resources and values, both natural and anthropogenic. These areas are typically identified by overlaying coastal erosion risks with the effects of land invasion by the sea due to extreme events (ocean surges and coastal flooding) projected for 2050. Critical Areas encompass: natural value zones, productive activity zones, and urban areas.<br>These Critical Areas play a crucial role in the POC-CE Territorial Model and in implementing the strategy for preventing and reducing coastal risks. Consequently, adaptive management and monitoring processes are essential to ensure adjustments following extreme events or adverse conditions. The adaptive management model of POC-CE should prioritise these Critical Areas, as they are more susceptible to extreme and erosive events.<br>As previously mentioned, Critical Areas require prioritised adaptation interventions due to their susceptibility to coastal risks and current land use. These interventions should be framed within specific adaptation strategies, guided by planning principles that balance intervention costs with benefits in safeguarding people, property, and natural values. The planning principles considered are those outlined in the Coastal Working Group Report, specifically: |



| | |
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| **2.4. Critical Areas(cont.)** | **2.4.2.1. Protection** - Interventions to defend areas of natural value, productive activity zones, and urban areas are to be carried out both in the delineated Critical Areas and in the adjacent Maritime Protection Zone, with the aim of maintaining or advancing the coastline.<br>**2.4.2.2. Accommodation** - Management measures for urban areas aimed at altering and adapting land use and human activities along the coast, as well as making existing infrastructure more flexible.<br>2.4.2.3. **Planned Retreat** - Interventions aimed at relocating urban areas away from the coastline by displacing uses and infrastructure and ensuring the renaturalisation of these areas.<br>Thus defined, the Critical Areas for Protection, Accommodation, and Planned Retreat do not have a specific protection regime. Instead, they are subject to the protection regimes related to the safeguarding of natural resources and values in the Territorial Protection Zone and the protection regimes defined for the Safeguard Strips, where spatial overlap with these delimitations occurs.<br>The strategy advocated by the POC-CE for these Critical Areas focuses on implementing adaptation strategies through the adoption of measures and interventions to address coastal risks rather than establishing a specific safeguarding regime.<br>The Territorial Model identifies 46 Critical Areas for Protection, Accommodation, and Planned Retreat along the coastal stretch from Caminha to Espinho, which are listed and described in the Program Report. |

**2.5. Coastal Margin**

Coastal margin is defined as a strip of land contiguous to or overlooking the boundary line of the watercourse bed, with a legally established width. The regime for the Margem also applies to public lands identified through the delimitation of the public water domain.

Regarding the delineation presented in the Territorial Model, it should be noted that it was estimated based on available geographic information and technical criteria approved by Portaria n.º 204/2016, July 25. This does not preclude its definition through the specific delimitation procedure for the public water domain as set out in Article 17 of Law n.º 54/2005, November 15, as amended, in Decree-Law n.º 353/2007, October 26, and Portaria n.º 931/2010, September 20, and may be updated by Environmental Portuguese Agency., in accordance with current legislation, whenever justified and deemed necessary.

Spaces within the Coastal Margin play essential roles in protecting and safeguarding water bodies and preserving the dynamics of physical and biological processes associated with the land-water interface. They also serve the general interest of access to water, passage along watercourses, and oversight and policing of waters by competent authorities.

### 2.6. Maritime Beaches

Maritime beaches are an important strategic resource in cultural, social, tourism, and economic terms. They also provide essential services for coastal protection, particularly by dissipating wave energy, which gives them a central role in the coastal risk adaptation strategy promoted by the POC-CE, within the framework of integrated sediment management of the coastal zone.

According to Article 10 of Decree-Law n.º 159/2012, of July 24, as amended, beaches should be enhanced and qualified, particularly those considered strategic for environmental and tourism reasons. These beaches should be subject to classification and measures that regulate their uses and activities. The classification of Maritime Beaches, as per the aforementioned decree-law, includes six types, determined by environmental characteristics, level of infrastructure, territorial context, and usage conditions of the beach in question.

The classification of Maritime Beaches includes six types based on their environmental characteristics, level of infrastructure, territorial context, and usage conditions:

a) Type I Beach - Urban Beach

b) Type II Beach - Peri-urban Beach

c) Type III Beach - Semi-natural Beach

d) Type IV Beach - Natural Beach

e) Type V Beach - Restricted Use Beach

f) Type VI Beach - Prohibited Use Beach

## COMPLEMENTARY COMPONENTS

### 1. Waves with Special Value for Surfing Sports

This component of the Territorial Model reflects the growing development of wave sports and their economic and social importance. It identifies locations recognised by the surfing community as significant, which, due to their morphological characteristics, offer waves of reasonable quality and consistency and attract a significant number of practitioners.

In these locations, safeguard measures should be implemented to prevent potential anthropogenic actions that could impact the submerged beach.

Within the intervention area of the POC-CE, 26 locations are identified as having waves with special value for surfing sports: six locations in the municipality of Espinho, four in Vila Nova de Gaia, three in each of the municipalities of Caminha, Vila do Conde, and Matosinhos, two in each of the municipalities of Viana do Castelo, Esposende, and Póvoa do Varzim, and one in the municipality of Porto.



### 2. Areas of Special Interest for Nature Conservation and Biodiversity

Areas of Special Interest for Nature Conservation and Biodiversity include the most environmentally and ecologically rich regions within the POC-CE intervention area. These areas comprise protected zones within the National Network of Protected Areas, areas designated by the Natura 2000 Network, and other natural areas with conservation value. In these areas, the management regimes outlined in specific instruments apply, including special and sectoral programs, which are enforced in addition to the regulations established by the POC-CE.

More specifically, this territorial component of the Territorial Model includes the following areas:

- Site of Community Importance of the Rio Minho (PTCON0019)

- Site of Community Importance of the Rio Lima (PTCON0020)

- Site of Community Importance of the Litoral Norte (PTCON0017)

- Site of Community Importance of the Barrinha de Esmoriz (PTCON0018)

- Special Protection Area of the Estuaries of the Minho and Coura Rivers (PTZPE001)

- Northern Litoral Natural Park

- Regional Protected Landscape of the Vila do Conde Coastline and Mindelo Ornithological Reserve

- Douro Estuary Local Natural Reserve

- Geosites of National Relevance: Metamorphic Complex of Foz do Douro (Nevogilde and Foz do Douro, Porto) and Lavadores Beach (Canidelo, Vila Nova de Gaia)

- Local Natural Monuments: Granite Pavements of Gatenha, Montedor Cliffs, Canto Marinho, Pedras Ruivas, and Ribeira de Anha.

### 3. Surface Water Resources

In the Territorial Model, surface water resources represent the essential coastal water system, which is significant for economic, social, and environmental purposes. It is crucial to preserve and enhance these resources to achieve the objectives of protecting the quality of coastal waters, aquatic ecosystems, and sedimentary resources. The main watercourses that make up this coastal sector are:

- In the Minho and Lima hydrographic region: Minho River, Âncora River, Lima River, and Neiva River.

- In the Cávado, Ave, and Leça hydrographic region: Cávado River, Ave River, and Leça River.

- In the Douro hydrographic region: Douro River.

### 4. Predominantly Artificialised Areas

The Predominantly Artificialised Areas broadly represent the urban system that structures the coastal stretch from Caminha to Espinho. These areas are characterised by the prevalence of artificial land use, whether in a continuous or extensive discontinuous manner. As such, and given that they do not contain biophysical systems that should be subject to a specific protection regime, they are identified autonomously in the Territorial Model, separate from the Coastal Protection Zones and the Complementary Protection Zone of the Terrestrial Protection Zone.

Given the current and future vulnerability of some of these areas to coastal risks, it is crucial to combine urban qualification policies with an adaptation policy that promotes the management of urban fronts from a precautionary and coastal risk prevention perspective. To this end, the POC-CE Directives define a set of general rules that should be incorporated into territorial plans to ensure the achievement of the strategic objectives of the POC-CE regarding the containment of urban expansion and scattered development along the coastline, alongside the protection and safeguarding of marine and terrestrial ecosystems.

**Port Areas**

Port Areas play a central role in the development of the maritime economy, particularly concerning fishing, recreational boating, and shipbuilding and repair. Commercial ports also serve as vital hubs in logistics chains, especially given the increasing volume of global maritime freight movements.

The Port Areas include regions under port jurisdiction, specifically:

- Port of Vila Praia de Âncora
- Port of Castelo de Neiva
- Port of Esposende
- Port of Póvoa de Varzim
- Port of Vila do Conde
- Port of Angeiras, all of which are under the jurisdiction of Docapesca, Portos e Lotas, S.A..

Additionally, the Port of Viana do Castelo and the Port of Leixões fall under the jurisdiction of APDL — Administração dos Portos do Douro, Leixões e Viana do Castelo, S.A.

In these Port Areas, management and planning are the responsibility of the Port Authority. This is notwithstanding the provisions in the Beach Intervention Plans and the powers of municipal bodies in the management of maritime beaches. All activities must adhere to the guidelines of the POC-CE and ensure compatibility with the safeguard regimes for natural resources and values.

**Fishing Villages**

Fishing Villages are coastal areas that host infrastructure and facilities for the unloading, packaging, storage, and commercialisation of fish, serving the local fishing fleet. These villages often represent communities where fishing is the primary source of income, holding significant economic, social, recreational, and cultural importance.

The Territorial Model identifies the following locations as Fishing Villages:

Vila Praia de Âncora;
Portinho do Lumiar;
Portinho de Vinhas;
Amorosa;
Pedra Alta;
Fão/Ofir;
Pedrinhas/Cedovém;
Apúlia/Couve;
Aver -o-Mar;
Caxinas;
Vila Chã;
Praia de Angeiras;
Praia do Marreco;
Foz do Douro;
Aguda;
Espinho;
Paramos.



# Appendix 10 – POC-CE 2021 Directives: Protection and Conservation of Coastal Biophysical Systems and Landscape, Natural Heritage and Landscape

**Table 7** POC-CE 2021 Directives: Protection and Conservation of Coastal Biophysical Systems and Landscape, Natural Heritage and Landscape - Landscape-related norms (highlighted in blue)

| **GENERAL DIRECTIVES \| Natural Heritage and Landscape** |
|---|
| **NG 7. In the context of protecting Coastal Biophysical Systems and the Landscape, particularly within planning and land management, the Administration should:** |
| a) Promote conservation actions, including:<br><br>i. Maintenance of the most significant floristic values, especially species of community interest listed in specific legislation or RELAPE species (Rare, Endemic, Locally Threatened, or Endangered);<br><br>ii. Conservation of the most significant faunistic values, particularly nesting, wintering, and migratory waterbird communities and other species of community interest listed in specific legislation;<br><br>iii. Control and eradication of invasive species;<br><br>iv. Restoration and protection of the dune cordon, especially in areas prone to flooding and coastal erosion. |
| b) Ensure the maintenance and promotion of estuarine biodiversity; |
| c) Promote scientific research applied to nature conservation and the management of marine living resources; |
| d) Promote information, awareness, and environmental education; |
| e) Ensure the protection of the biophysical integrity of the area and the conservation of environmental and landscape values, the enhancement of existing resources in the coastal zone, the integration of local specificities, the creation of conditions for the maintenance, development, and expansion of relevant activities, public enjoyment in safety within the water domain, and the flexibility and adaptability of management measures; |
| f) Ensure the preservation, protection, and restoration of natural values and coastal and marine ecosystems, as well as the prevention of risks and minimisation of the impacts resulting from climatic factors or human activities; |
| g) Maintain and promote marine biodiversity; |
| h) Expand knowledge about coastal habitats (including mapping, characterisation of biology, conservation status, and identification of threats); |
| i) Clearly and unequivocally identify in intermunicipal and municipal plans the resources and natural values of strategic importance, detailing the restrictions and conditions for their use and occupation; |
| j) Establish protection standards for natural and heritage values in territorial plans and identify sensitive and at-risk areas, ensuring their safeguarding. |

| GENERAL DIRECTIVES \| Natural Heritage and Landscape |
|---|
| k) Ensure that tourism, particularly nature tourism, aligns with the sustainable development of the region and promotes environmental education and awareness to enhance public understanding and support for biodiversity conservation; |
| l) Promote scientific research and monitoring of key habitats, species, and hydrological and sedimentary processes, contributing to adaptive management based on technical and scientific knowledge; |
| m) Ensure that no toxic or pollutant substances, or explosives that could harm or disturb flora or fauna specimens, are used; |
| n) Safeguard areas of high scenic landscape and environmental quality. |
| o) Avoid obstructing landscape vistas, ensuring the scenic integration of constructions; |
| p) Protect and enhance the character, identity, and key elements of the coastal landscape between Caminha and Espinho, including the definition of landscape quality objectives in accordance with the European Landscape Convention and the National Architecture and Landscape Policy; |
| q) Promote the preservation, safeguarding, and enhancement of architectural, archaeological, and landscape heritage along the coast and its urban areas; |
| r) Support the protection and enhancement of cultural heritage and agricultural production systems that contribute to the quality and character of the rural landscape; |
| s) Enhance the structural elements of the landscape. |



# APPENDIX 11 - Methodology for orthomosaic generation and LULC classification for 1965

The historical aerial images were digitised and processed in photogrammetric software in order to generate orthomosaics, which were correctly georeferenced. The methodology described by Gonçalves (2016), based on the software Agisoft Metashape, was used. Large image blocks, with stereoscopic overlaps, go through an automatic process of identification of homologous points, leading to a 3D model of the terrain. Although many changes may exist when comparing historical photos with present-time orthoimages, it is normally possible to identify some unchanged points that can be used for rigorous georeferencing of historical photos. The positional accuracy achieved was a few meters, which was quite enough to combine with present-time geographical data in a GIS.

We then mapped and classified LULC for 1965 in vector format within a GIS environment, using the Agricultural and Forestry Map of Continental Portugal 1951-1980 (Sequeira et al., 2022). The Agricultural and Forestry Maps of Portugal (surveyed from 1882), the National Forest Inventories (initiated in 1965/66), and the LULC Maps (starting from 1990-1995). Sequeira et al. (2022) harmonised these historical data to produce a new map covering 1951 to 1980, compatible with the LULC used by the National governmental agency, facilitating historical analysis. Detailed information on the datasets used for the quantitative spatiotemporal analysis can be found in Table 8.

**Table 8** Data sources used for the spatiotemporal analysis and their download links

| Dataset | Entity | Link |
|---|---|---|
| Aerial images 1965 | The Northen Region Coordination and Development Commission<br><br>Directorate-General for the Territory | Not available |
| Agricultural and Forestry Map of Continental Portugal 1951-1980 (Report, in Portuguese) | Centro de Ecologia Aplicada "Prof. Baeta Neves" (CEABNInBIO – Instituto Superior de Agronomia<br><br>Directorate-General for the Territory | https://geo2.dgterritorio.gov.pt/maf/MAF1951-1980_RelatorioTecnico.pdf |
| Agricultural and Forestry Map of Continental Portugal 1951-1980 (shapefiles) | Centro de Ecologia Aplicada "Prof. Baeta Neves" (CEABNInBIO – Instituto Superior de Agronomia<br><br>Directorate-General for the Territory | https://geo2.dgterritorio.gov.pt/maf/MAF1951_80v1-shp.zip |
| Study LRCZCC 77/78 development | | |
| LULC 1995 | Directorate-General for the Territory | https://geo2.dgterritorio.gov.pt/cos/COS1995/COS1995v2-shp.zip |
| POOC-CE 1999 approval | | |
| LULC 2007 | Directorate-General for the Territory | https://geo2.dgterritorio.gov.pt/cos/COS2007/COS2007v3-shp.zip |
| LULC 2018 | Directorate-General for the Territory | https://geo2.dgterritorio.gov.pt/cos/COS2018/COS2018v2-shp.zip |
| LULC 1995, 2007, 2010, 2015, and 2018 harmonisation (Report, in portuguese) | Directorate-General for the Territory | https://www.dgterritorio.gov.pt/sites/default/files/documentos-publicos/ET-COS-1995-2007-2010-2015-2018-v1.pdf |
| POC-CE 2021 approval | | |



# APPENDIX 12 - Methodological steps for analysing and completing the LRCZCC 77/78

**Landscape recognition of the coastal zone between Caminha and Cortegaça*, by Ilídio Araújo (Agricultural Engineer and Landscape Architect)**

**Porto, 1977-78**

*Available for in-person consultation at the Forte de Sacavém, SIPA – Information System for Architectural Heritage, Sacavém, Portugal.

The study developed by Ilídio de Araújo is incomplete. To assess the content of the study, we established the following steps:

**Step 1:** The study is divided into five volumes. We compiled a list of all elements (written and graphical) involved in the study to determine which information is available, incomplete, or missing (Table 9).

**Step 2:** After completing Step 1, it was concluded that Volumes 1 (Minho to Lima) and 5 (Douro to Cortegaça) are the most complete and the only ones that include landscape planning/protection maps (Figure 5 to Figure 14). These maps synthesise the landscape assessment produced by Ilídio de Araújo, clearly presenting the main elements that should be protected and enhanced. However, these maps are also incomplete, as they do not represent all the written information available in their corresponding chapters. To summarise the author's intentions, we reviewed and described (where possible) the categories and subcategories from both the text and the maps that each Volume presents for its landscape planning/protection map (see Table 10 for Volume 1 and Table 11 for Volume 5).

**Step 3:** To identify their differences and similarities, we summarise and compare the categories and subcategories used in Volumes 1 and 5 in Table 12. Despite the differences in the nomenclature, Ilídio de Araújo had a clear vision of which areas were more relevant and should be safeguarded. A common trend is that the author based the main categories of the landscape planning/protection maps in the Decree-Law 613/76, which established a new regime for nature protection and the creation of national parks. Error! Reference source not found. describes the categories outlined in DL 613/76, considering their relevance for the next step.

**Step 4:** At this stage, we proposed a standardisation of the possible categories that Ilídio de Araújo might have used across the entire study area by cross-referencing Table 12 and Table 13. This proposal (Table 14) allows us to infer Ilídio de Araújo's intended approach for the study area, helping to reconstruct what he likely aimed to achieve with his study despite its incompleteness. By standardising the categories based on the available data, we can approximate his approach and gain insight into the broader implications of his study had it been fully realised and implemented.

**Step 5:** Based on the previous standardisation, we were able to map out his intended framework, illustrating how the coastal landscape in our three case studies (Vila do Conde, Póvoa de Varzim, and Esposende) would have been protected in 1977-1978 (Table 15 and Figure 15).

**Table 9** Index of written and graphical elements available for the study" Landscape recognition of the coastal zone between Caminha and Cortegaça"

| **Texts Index** | | **Maps Index** | |
|---|---|---|---|
| **Text** | **Notes** | **Maps** | **Notes** |
| Introduction | | The Continental Shelf (map drawn up with information supplied by the Maritime Geology Services of the DGMSG), scale 1/250 000 | |
| The Continental Shelf | | Not applicable | Not applicable |
| **Volume I. Landscape recognition of the coastal zone from Minho to Lima** | | | |
| 1. Oro-hydrography | | 01. Oro-hydrography map, scale 1/25 000 | |
| 2. Geomorphology | | 05. Geomorphological Sketch, scale 1/25 000 | |
| 3. Geology | | 02. Geological map, scale 1/25 000 | |
| 4. Mineral Resources | | 03. Map of Mineral Resources, scale 1/25 000 | |
| | | 04. Map of Geological Constraints to Construction, scale 1/25 000 | |
| 6. Water resources | | 06. Map of Water resources, scale 1/25 000 | |
| 7. Energy resources | | 07. Map of Energy resources, scale 1/25 000 | |
| 8. Soils | | 08. Map of Agricultural Aptitude (according to SROA's agricultural planning draft), scale 1/25 000 | |
| 9. Ecological zoning | | 09. Map of Ecosystems, scale 1/25 000 | |
| 10. Humanisation of the Landscape | | Not applicable | |
| .... and Settlements | | 10. Map of Human Resources, scale 1/25 000 | |
| 11. Cultural Heritage | | 11. Cultural Heritage, scale 1/25 000 | |
| 12. Recreational Aptitude | | 12. Map of Recreational Potential, scale 1/25 000 | |
| 13. Degradations | | 13. Map of Degradations, scale 1/25 000 | |
| 14. Landscape Protection | | Map of landscape planning, scale 1/25 000 | |
| Bibliography of History and Art | | Not applicable | Not applicable |
| **Volume II. Landscape recognition of the coastal zone from Lima to Cávado** | | | |
| 1. Oro-hydrography | | 01. Oro-hydrography map, scale 1/25 000 | |
| Geomorphology | | 05. Geomorphological Sketch, scale 1/25 000 | |
| 2. Geology | | 02. Geological map, scale 1/25 000 | |
| 3. Mineral Resources | | 03. Map of Mineral Resources, scale 1/25 000 | |
| | | 04. Map of Geological Constraints to Construction, scale 1/25 000 | |
| 6. Water resources | | 06. Map of Water resources, scale 1/25 000 | |
| 7. Energy resources | | 07. Map of Energy resources, scale 1/25 000 | |
| 8. Soils | | 08. Map of Agricultural Aptitude (according to SROA's agricultural planning draft), scale 1/25 000 | |
| 9. Ecological zoning | | 09. Map of Ecosystems, scale 1/25 000 | |
| 10. Humanisation of the Landscape | | 10. Map of Human Resources, scale 1/25 000 | |
| .... and Settlements | | | |
| 11. Cultural Heritage | | 11. Cultural Heritage, scale 1/25 000 | |
| 12. Recreational Aptitude | | 12. Map of Recreational Potential, scale 1/25 000 | |
| 13. Degradations | | 13. Map of Degradations, scale 1/25 000 | |
| 14. Landscape Protection | | Map of landscape planning, scale 1/25 000 | |
| Bibliography of History and Art | | Not applicable | Not applicable |
| **Volume III. Landscape recognition of the coastal zone from Cávado to Ave** | | | |
| 1. Oro-hydrography | | 01. Oro-hydrography map, scale 1/25 000 | |
| Geomorphology | | 05. Geomorphological Sketch, scale 1/25 000 | |
| 2. Geology | | 02. Geological map, scale 1/25 000 | |
| 3. Mineral Resources | | 03. Map of Mineral Resources, scale 1/25 000 | |
| | | 04. Map of Geological Constraints to Construction, scale 1/25 000 | |
| 6. Water resources | | 06. Map of Water resources, scale 1/25 000 | |
| 7. Energy resources | | 07. Map of Energy resources, scale 1/25 000 | |
| 8. Soils | | 08. Map of Agricultural Aptitude (according to SROA's agricultural planning draft), scale 1/25 000 | |
| 9. Ecological zoning | | 09. Map of Ecosystems, scale 1/25 000 | |
| 10. Humanisation of the Landscape | | 10. Map of Human Resources, scale 1/25 000 | |
| .... and Settlements | | | |
| 11. Cultural Heritage | | 11. Cultural Heritage, scale 1/25 000 | |

| Texts Index | | Maps Index | |
|---|---|---|---|
| 12. Recreational Aptitude | | 12. Map of Recreational Potential, scale 1/25 000 | |
| 13. Degradations | | 13. Map of Degradations, scale 1/25 000 | |
| 14. Landscape Protection | | Map of landscape planning, scale 1/25 000 | |
| Bibliography of History and Art | | Not applicable | Not applicable |
| **Volume IV. Landscape recognition of the coastal zone from Ave to Douro** | | | |
| 1. Oro-hydrography | | 01. Oro-hydrography map, scale 1/25 000 | |
| 2. Geomorphology | | 05. Geomorphological Sketch, scale 1/25 000 | |
| 3. Geology | | 02. Geological map, scale 1/25 000 | |
| 4. Mineral Resources | | 03. Map of Mineral Resources, scale 1/25 000 | |
| | | 04. Map of Geological Constraints to Construction, scale 1/25 000 | |
| 6. Water resources | | 06. Map of Water resources, scale 1/25 000 | |
| 7. Energy resources | | 07. Map of Energy resources, scale 1/25 000 | |
| 8. Soils | | 08. Map of Agricultural Aptitude (according to SROA's agricultural planning draft), scale 1/25 000 | |
| 9. Ecological zoning | | 09. Map of Ecosystems, scale 1/25 000 | |
| 10. Humanisation of the Landscape | | 10. Map of Human Resources, scale 1/25 000 | |
| .... and Settlements | | | |
| 11. Cultural Heritage | | 11. Cultural Heritage, scale 1/25 000 | |
| 12. Recreational Aptitude | | 12. Map of Recreational Potential, scale 1/25 000 | |
| 13. Degradations | | 13. Map of Degradations, scale 1/25 000 | |
| 14. Landscape Protection | | Map of landscape planning, scale 1/25 000 | |
| Bibliography of History and Art | | Not applicable | Not applicable |
| **Volume V. Landscape recognition of the coastal zone from Douro to Cortegaça** | | | |
| 1. Oro-hydrography | | 01. Oro-hydrography map, scale 1/25 000 | |
| 5. Geomorphology | | 05. Geomorphological Sketch, scale 1/25 000 | |
| 2. Geology | | 02. Geological map, scale 1/25 000 | |
| 4. Mineral Resources | | 03. Map of Mineral Resources, scale 1/25 000 | |
| | | 04. Map of Geological Constraints to Construction, scale 1/25 000 | |
| 6. Water resources | | 06. Map of Water resources, scale 1/25 000 | |
| 7. Energy resources | | 07. Map of Energy resources, scale 1/25 000 | |
| 8. Soils / Soil Resources | | 08. Map of Agricultural Aptitude (according to SROA's agricultural planning draft), scale 1/25 000 | |
| 9. Ecological zoning | | 09. Map of Ecosystems, scale 1/25 000 | |
| 10. Humanisation of the Landscape | | 10. Map of Human Resources, scale 1/25 000 | |
| .... and Settlements | | | |



| Texts Index | | Maps Index | |
|---|---|---|---|
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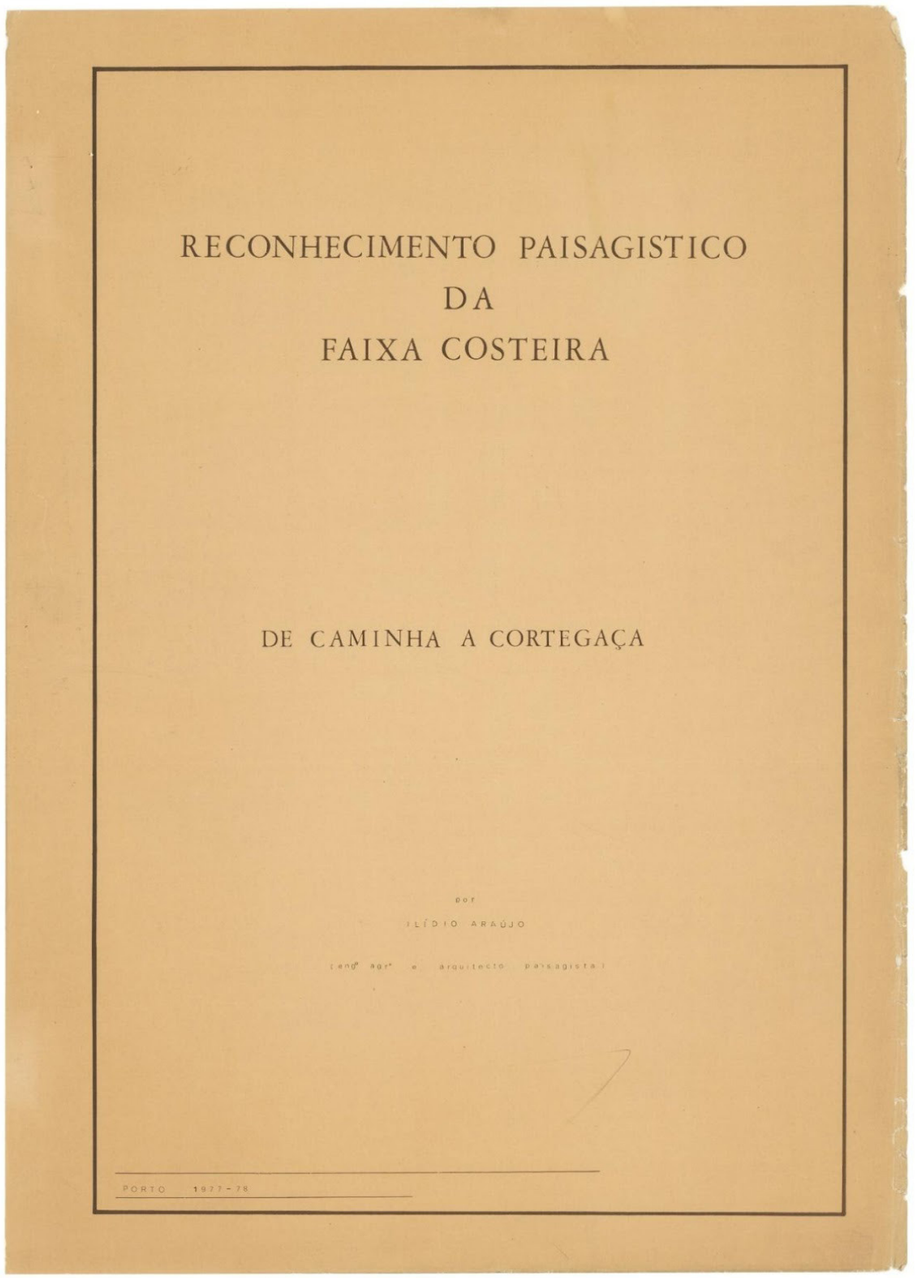
|---|---|---|---|



RECONHECIMENTO PAISAGISTICO
DA
FAIXA COSTEIRA

DE CAMINHA A CORTEGAÇA

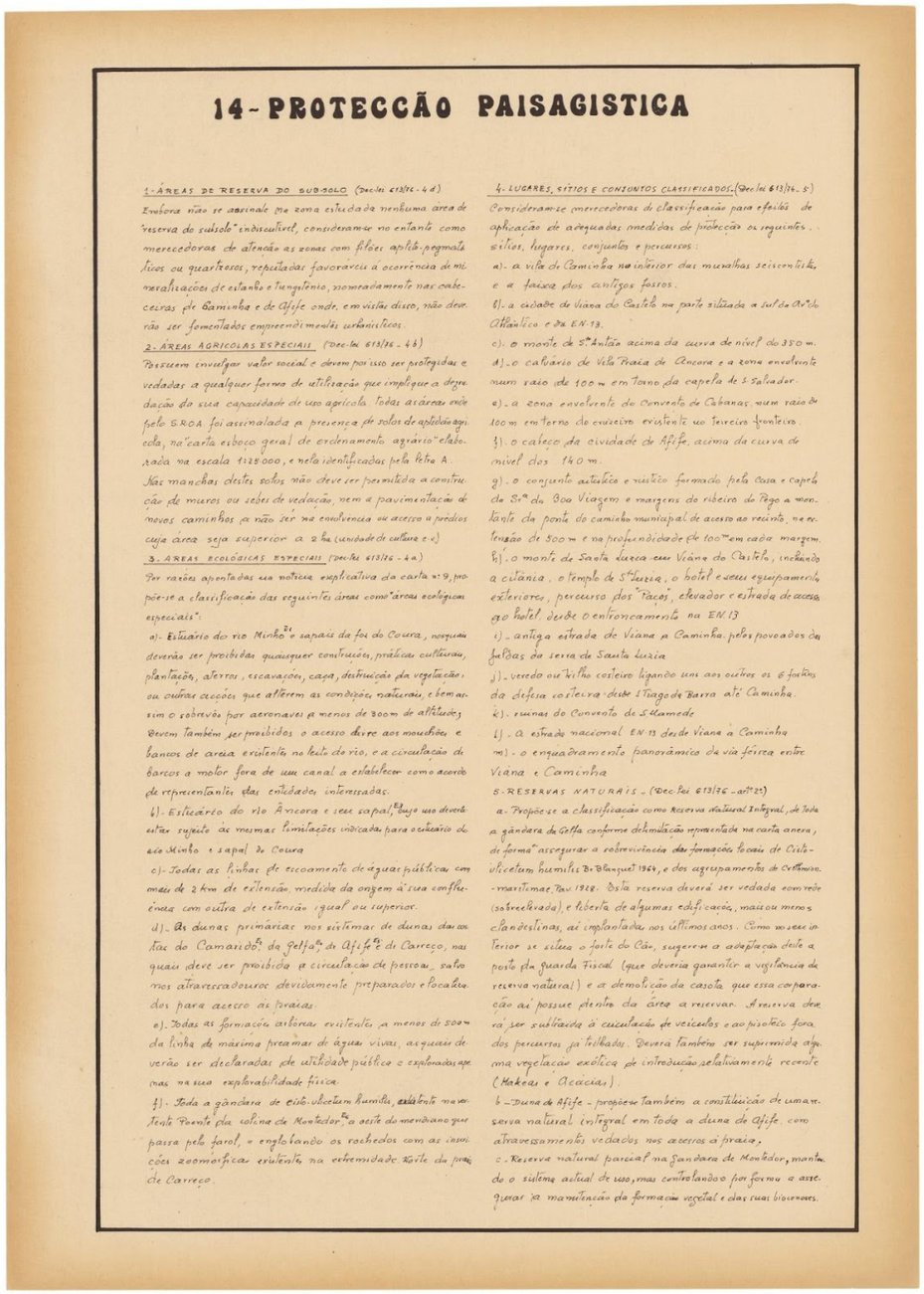
por

ILÍDIO ARAÚJO

(engº agrº e arquitecto paisagista)

PORTO 1977-78

**Figure 5** Figure 1: Cover of the LRCZCC 77/78 (Araújo, 1978) © SIPA – Sistema de Informação para o Património Arquitetónico, Portugal, used with permission



## 14 - PROTECÇÃO PAISAGISTICA

1 - ÁREAS DE RESERVA DO SUB-SOLO (Dec-lei 613/76 - 4.4)
Embora não se assinale na zona estudada nenhuma área de "reserva de subsolo" indiscutível, consideram-se no entanto como merecedoras de atenção as zonas com filões aplito-pegmatíticos ou quartzosos, repetidas favoráveis à ocorrência de mineralizações de estanho e tungsténio, nomeadamente nas cabeceiras de Caminha e de Afife onde, em vistas disso, não devem ser fomentados empreendimentos urbanísticos.

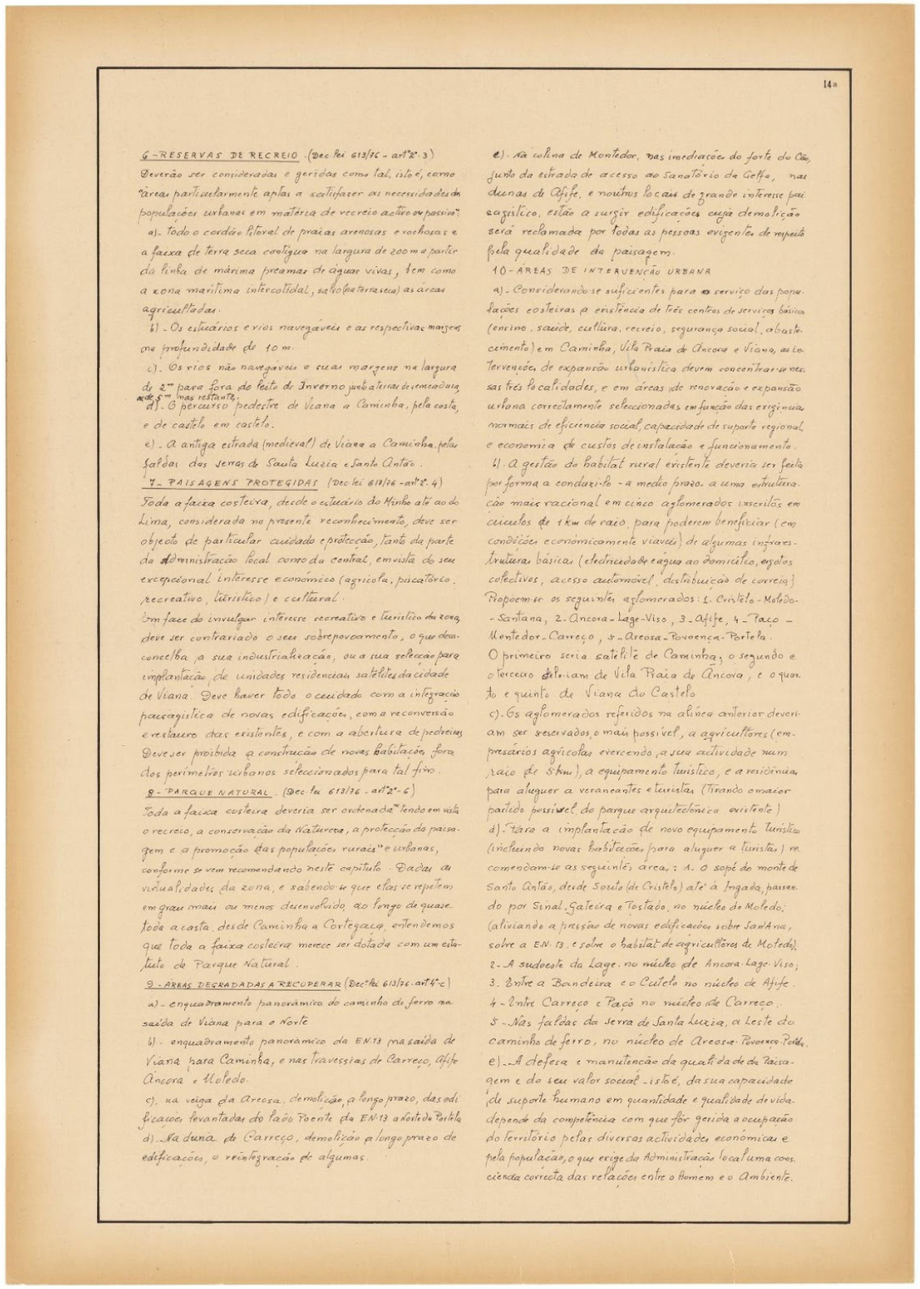
2 - ÁREAS AGRÍCOLAS ESPECIAIS (Dec-lei 613/76 - 4.3)
Possuem inequívoco valor social e devem por isso ser protegidas e vedadas a qualquer forma de utilização que implique a degradação da sua capacidade de uso agrícola. Todas as áreas onde pelo S.R.O.A. foi assinalada a presença de solos de aptidão agrícola, na "carta esboço geral de ordenamento agrário" elaborada na escala 1:25 000, e nela identificadas pela letra A.
Nas manchas destes solos não deve ser permitida a construção de muros ou sebes de vedação, nem a pavimentação de novos caminhos a não ser na envolvência ao acesso a prédios cuja área seja superior a 2 ha (unidade de cultura c.c.)

3 - ÁREAS ECOLÓGICAS ESPECIAIS (Dec-lei 613/76 - 4.2)
Por razões apontadas na notícia explicativa da carta n.º 9, propõe-se a classificação das seguintes áreas como "áreas ecológicas especiais":
a) - Estuário do rio Minho 2ª e zona da foz do Coura, nas quais deverão ser proibidas quaisquer construções, práticas culturais, plantações, aterros, escavações, caça, destruição da vegetação, ou outras acções que alterem as condições naturais, e bem assim o sobrevôo por aeronaves a menos de 300 m de altitude; devem também ser proibidos o acesso livre aos moliceiros e bancos de areia existentes no leito do rio, e a circulação de barcos a motor fora de um canal a estabelecer como acordo de representantes das entidades interessadas.
b) - Estuário do rio Âncora e seu sapal, cujo uso deverá estar sujeito às mesmas limitações indicadas para o estuário do rio Minho e sapal do Coura.
c) - Todas as linhas de escoamento de águas públicas com mais de 2 km de extensão, medida da origem à sua confluência com outra de extensão igual ou superior.
d) - As dunas primárias nos sistemas de dunas das zonas do Camarido, da Gelfa e de Afife e do Carreço, nas quais deve ser proibida a circulação de pessoas, salvo nos atravessadouros devidamente preparados e localizados para acesso às praias.
e) - Todas as formações arbóreas existentes a menos de 500 m da linha de máxima preamar de águas vivas, as quais deverão ser declaradas de utilidade pública e exploradas apenas na sua exploralibidade física.
f) - Toda a gândara de Cristo Ulicetum humilis, existente no vértice Ponte da colina de Montedor, a oeste do meridiano que passa pelo farol, e englobando os rochedos com as inscrições zoomorficas existentes na extremidade Norte da praia de Carreço.

4 - LUGARES, SÍTIOS E CONJUNTOS CLASSIFICADOS (Dec-lei 613/76 - 5)
Consideram-se merecedoras de classificação para efeitos de aplicação de adequadas medidas de protecção os seguintes sítios, lugares, conjuntos e percursos:
a) - a vila de Caminha no interior das muralhas seiscentistas e a faixa dos antigos fossos.
b) - a cidade de Viana do Castelo na parte situada a sul do Oº do Atlântico e da EN-13.
c) - o monte de Stª Luzia acima da curva de nível dos 350 m.
d) - o calvário de Vila Praia de Âncora e a zona envolvente num raio de 100 m em torno da capela de S. Salvador.
e) - a zona envolvente do Convento de Cabanas num raio de 100 m em torno do cruzeiro existente no terreiro fronteiro.
f) - o cabeço da cividade de Afife, acima da curva de nível dos 140 m.
g) - o conjunto arquitectónico e rústico formado pela casa e capela de Stª da Boa Viagem e margens do ribeiro do Pego a montante da ponte do caminho municipal de acesso ao recinto, na extensão de 500 m e na profundidade de 100 m em cada margem.
h) - o monte de Santa Luzia em Viana do Castelo, incluindo a cidadela, o templo de Stª Luzia, o hotel e seus equipamentos exteriores, percurso dos "Tacos", elevador e estrada de acesso ao hotel, desde o entroncamento na EN 13.
i) - antiga estrada de Viana a Caminha pelos povoados da Gaibas da serra de Santa Luzia.
j) - veredo ou trilho costeiro ligando uns aos outros os fortins da defesa costeira desde Stiago da Barra até Caminha.
k) - ruínas do Convento de S. Lamedo.
l) - a estrada nacional EN-13 desde Viana a Caminha.
m) - o enquadramento panorâmico da via férrea entre Viana e Caminha.

5 - RESERVAS NATURAIS - (Dec-lei 613/76 - artº 21)
a - Propõe-se a classificação como Reserva Natural Integral, de toda a gândara de Gelfa conforme delimitação representada na carta anexa, de forma a assegurar a sobrevivência das formações locais de Cristo-Ulicetum humilis Br.-Blanquet 1964, e dos agrupamentos de Crithmo-maritimae Tx. 1948. Esta reserva deverá ser vedada com rede (sobrelevada), e liberta de algumas edificações, mais ou menos clandestinas, aí implantadas nos últimos anos. Como no seu interior se situa o forte do Cão, sugere-se a adaptação deste a posto da guarda fiscal (que deveria garantir a vigilância da reserva natural) e a demolição da caserna que essa comparação aí possue dentro da área a reservar. A reserva deverá ser subtraída à circulação de veículos e ao pisoteio fora dos percursos já trilhados. Deverá também ser suprimida alguma vegetação exótica de introdução relativamente recente (Mimosas e Acacias).
b - Duna de Afife - propõe-se também a constituição de uma reserva natural integral em toda a duna de Afife, com atravessamentos vedados nos acessos à praia.
c - Reserva natural parcial na gândara de Montedor, mantendo o sistema actual de uso, mas controlando por forma a assegurar a manutenção da formação vegetal e das suas biocenoses.

**Figure 6** Figure 2: Chapter Landscape Planning/Protection (1/2) in Volume I produced by Araújo (1978). © SIPA – Sistema de Informação para o Património Arquitetónico, Portugal, used with permission



14a

6 - RESERVAS DE RECREIO (Dec-lei 613/76 - art.º 3)

Deverão ser consideradas e geridas como tal, isto é, como áreas particularmente aptas a satisfazer as necessidades da populações urbanas em matéria de recreio activo ou passivo:

a). todo o cordão litoral de praias arenosas e rochosas e a faixa de terra seca contígua na largura de 200 m a partir da linha de máxima preamar de águas vivas, bem como a zona marítima intercotidal, salvo (para terra seca) as áreas agricultadas.

b). Os estuários e rios navegáveis e as respectivas margens na profundidade de 10 m.

c). Os rios não navegáveis e suas margens na largura de 2m para fora do leito de Inverno (ou a linha de água mais 5m mas restante).

d). O percurso pedestre de Viana a Caminha, pela costa, e de castelo em castelo.

e). A antiga estrada (medieval) de Viana a Caminha, pelas Saídas dos Senos de Santa Luzia e Santo António.

7 - PAISAGENS PROTEGIDAS (Dec-lei 613/76 - art.º 4)

Toda a faixa costeira, desde o estuário do Minho até ao do Lima, considerada no presente reconhecimento, deve ser objecto de particular cuidado e protecção, tanto da parte da Administração local como da central, em vista do seu excepcional interesse económico (agrícola, piscatório, recreativo, turístico) e cultural.

Em face do invulgar interesse recreativo e turístico da zona, deve ser contrariado o seu sobrepovoamento, o que desaconselha a sua industrialização, ou a sua selecção para implantação de unidades residenciais satélites da cidade de Viana. Deve haver todo o cuidado com a integração paisagística de novas edificações, com a reconversão e restauro das existentes, e com a abertura de pedreiras. Deve ser proibida a construção de novas habitações, fora dos perímetros urbanos seleccionados para tal fim.

8 - PARQUE NATURAL (Dec-lei 613/76 - art.º 5-c)

Toda a faixa costeira deveria ser ordenada tendo em vista o recreio, a conservação da Natureza, a protecção da paisagem e a promoção das populações rurais e urbanas, conforme se vem recomendando neste capítulo. Dadas as virtualidades da zona, e sabendo-se que elas se repetem em grau maior ou menor ao longo de quase toda a costa, desde Caminha a Cortegaça, entendemos que toda a faixa costeira merece ser dotada com um estatuto de Parque Natural.

9 - ÁREAS DEGRADADAS A RECUPERAR (Dec-lei 613/76 - art.º 6-c)

a) - enquadramento panorâmico do caminho de ferro na saída de Viana para o Norte

b) - enquadramento panorâmico da EN 13 na saída de Viana para Caminha, e nas travessias de Carreço, Afife, Âncora e Moledo.

c). na veiga da Arcosa - demolição, a longo prazo, das edificações levantadas do lado Poente da EN 13 a Moledo-Portela.

d). Na duna de Carreço, demolição a longo prazo de edificações, e reintegração de algumas.

e). Na colina de Montedor, nas imediações do forte do Cabedelo, nas dunas de Afife, e noutros locais de grande interesse paisagístico, estão a surgir edificações cuja demolição será reclamada por todas as pessoas exigentes de respeito pela qualidade da paisagem.

10 - ÁREAS DE INTERVENÇÃO URBANA

a) - Considerando-se suficientes para o serviço das populações costeiras a existência de três centros de serviços básicos (ensino, saúde, cultura, recreio, segurança social, abastecimento) em Caminha, Vila Praia de Âncora e Viana, as intervenções de expansão urbanística devem concentrar-se nessas três localidades, e em áreas de renovação e expansão urbana correctamente seleccionadas em função das exigências mínimas de eficiência social, capacidade de suporte regional, e economia de custos de instalação e funcionamento.

b). A gestão do habitat rural existente deveria ser feita por forma a conduzir-se - a médio prazo - a uma estruturação mais racional em cinco aglomerados inseridos em círculos de 1 km de raio para poderem beneficiar (em condições economicamente viáveis) de algumas infra-estruturas básicas (electricidade e água ao domicílio, esgotos colectivos, acesso automóvel, distribuição de correio). Propõem-se os seguintes aglomerados: 1. Cristelo - Moledo - Santana, 2. Âncora - Lage - Viso, 3. Afife, 4. Paço - Montedor - Carreço, e 5. Arcosa - Povoença - Portela.

O primeiro seria satélite de Caminha, o segundo e o terceiro pertenceriam de Vila Praia de Âncora, e o quarto e quinto de Viana do Castelo.

c). Os aglomerados referidos na alínea anterior deveriam ser reservados, o mais possível, a agricultores (empresários agrícolas exercendo a sua actividade num raio de 5 km), a equipamento turístico, e a residência para alugar a veraneantes e turistas. (Tirando o maior partido possível do parque arquitectónico existente)

d). Para a implantação de novo equipamento turístico (incluindo novas habitações para alugar a turistas) recomendam-se as seguintes áreas: 1. O sopé do monte de Santa Luzia, desde Souto (de Cristelo) até à Ingada, passando por Sinal - Gaieira e Tostado, no núcleo de Moledo; (aliviando a pressão de novas edificações sobre Santana, sobre a EN. 13 - e sobre o habitat de agricultores de Moledo). 2 - A sudoeste da Lage - no núcleo de Âncora - Lage - Viso; 3. Entre a Bandeira e o Castelo no núcleo de Afife. 4 - Entre Carreço e Paço no núcleo de Carreço. 5 - Nas faldas da Serra de Santa Luzia, a Leste do caminho de ferro, no núcleo de Arcosa - Povoença - Portela.

e). - A defesa e manutenção da qualidade da paisagem e do seu valor social - isto é, da sua capacidade de suporte humano em quantidade e qualidade de vida - depende da competência com que for gerida a ocupação do território pelas diversas actividades económicas e pela população, o que exige da Administração local uma consciência correcta das relações entre o Homem e o Ambiente.

**Figure 7** Chapter Landscape Planning/Protection (2/2) in Volume I produced by Araújo (1978). © SIPA – Sistema de Informação para o Património Arquitetónico, Portugal, used with permission

**Figure 8** Landscape Planning/Protection Map (1/4) in Volume I produced by Araújo (1978). © SIPA – Sistema de Informação para o Património Arquitetónico, Portugal, used with permission

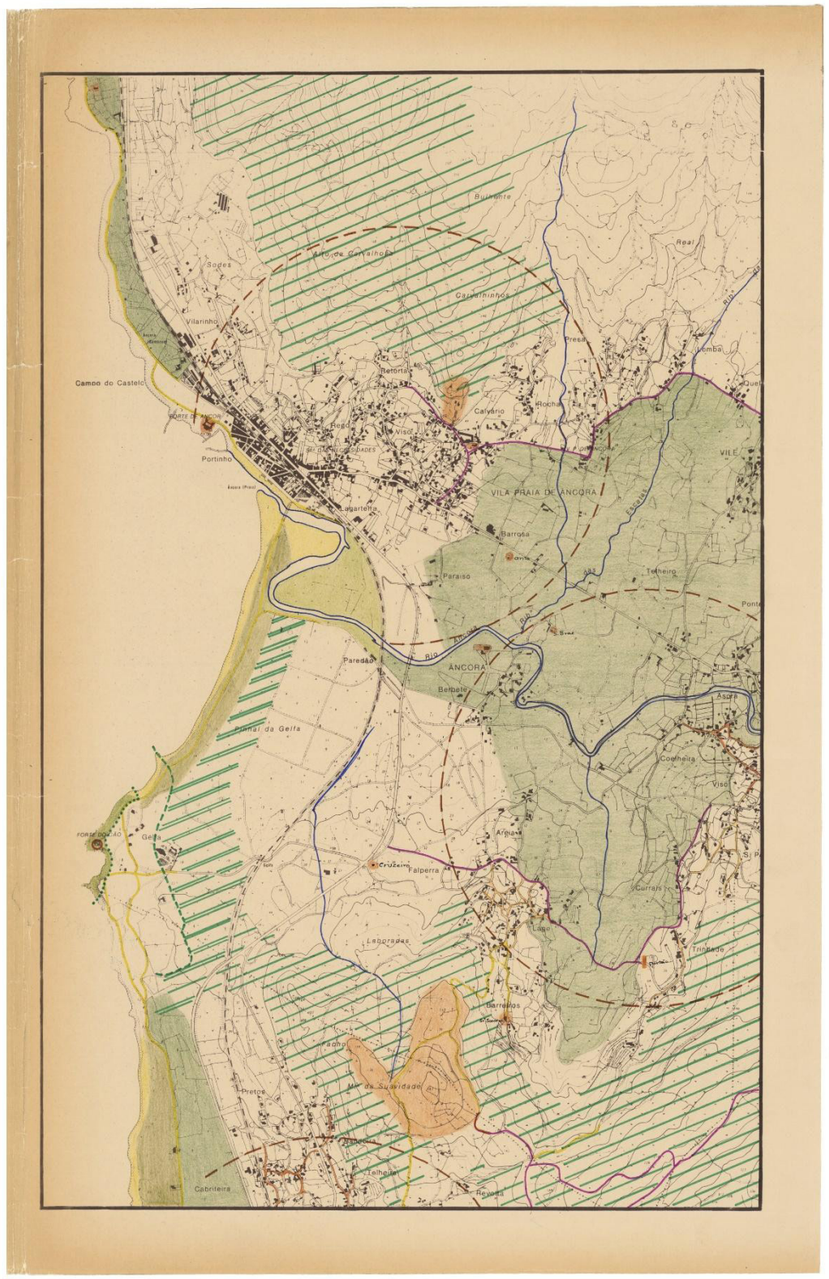



**Figure 9** Landscape Planning/Protection Map (2/4) in Volume I produced by Araújo (1978). © SIPA – Sistema de Informação para o Património Arquitetónico, Portugal, used with permission

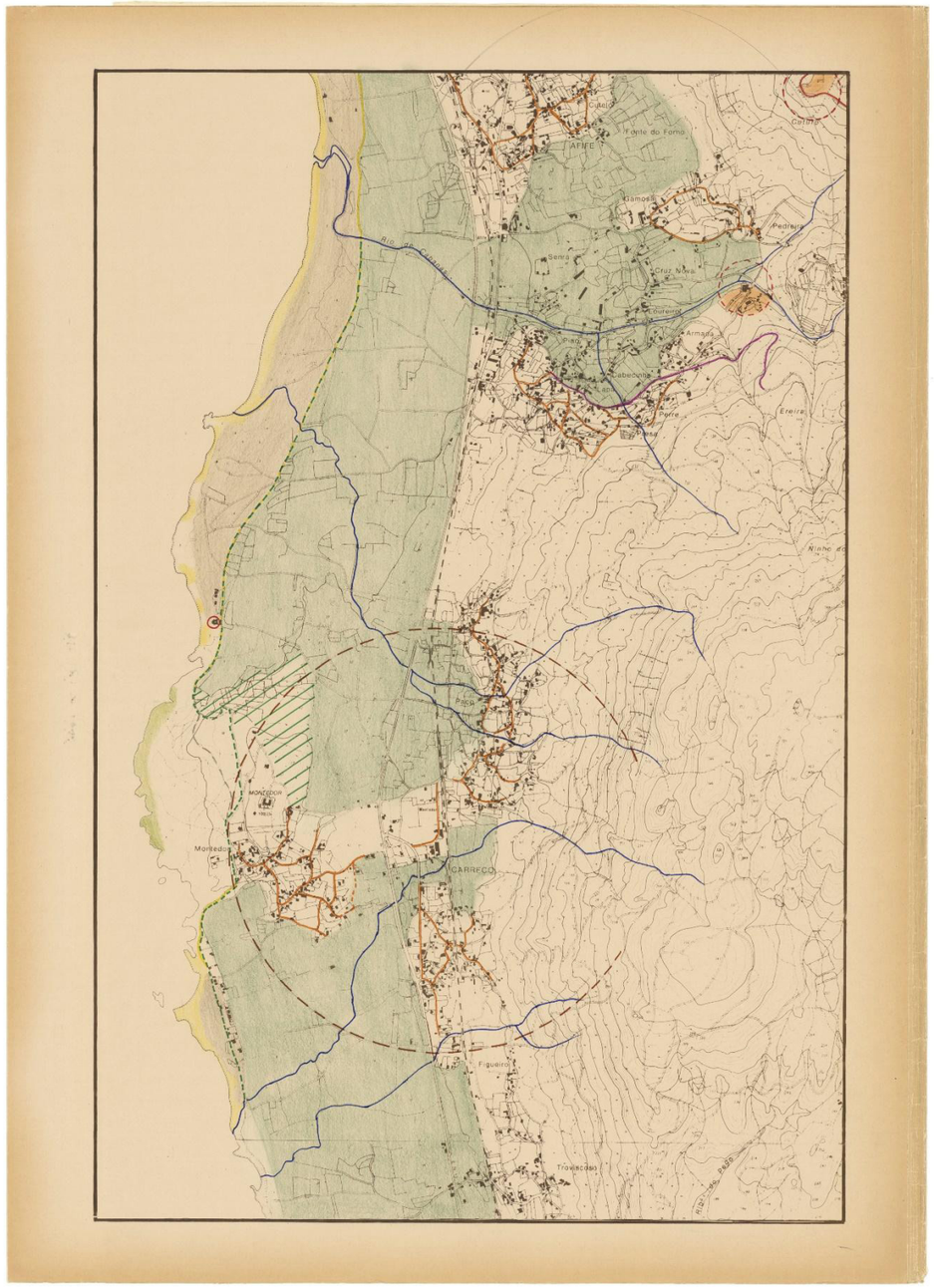



**Figure 10** Landscape Planning/Protection Map (3/4) in Volume I produced by Araújo (1978). © SIPA – Sistema de Informação para o Património Arquitetónico, Portugal, used with permission

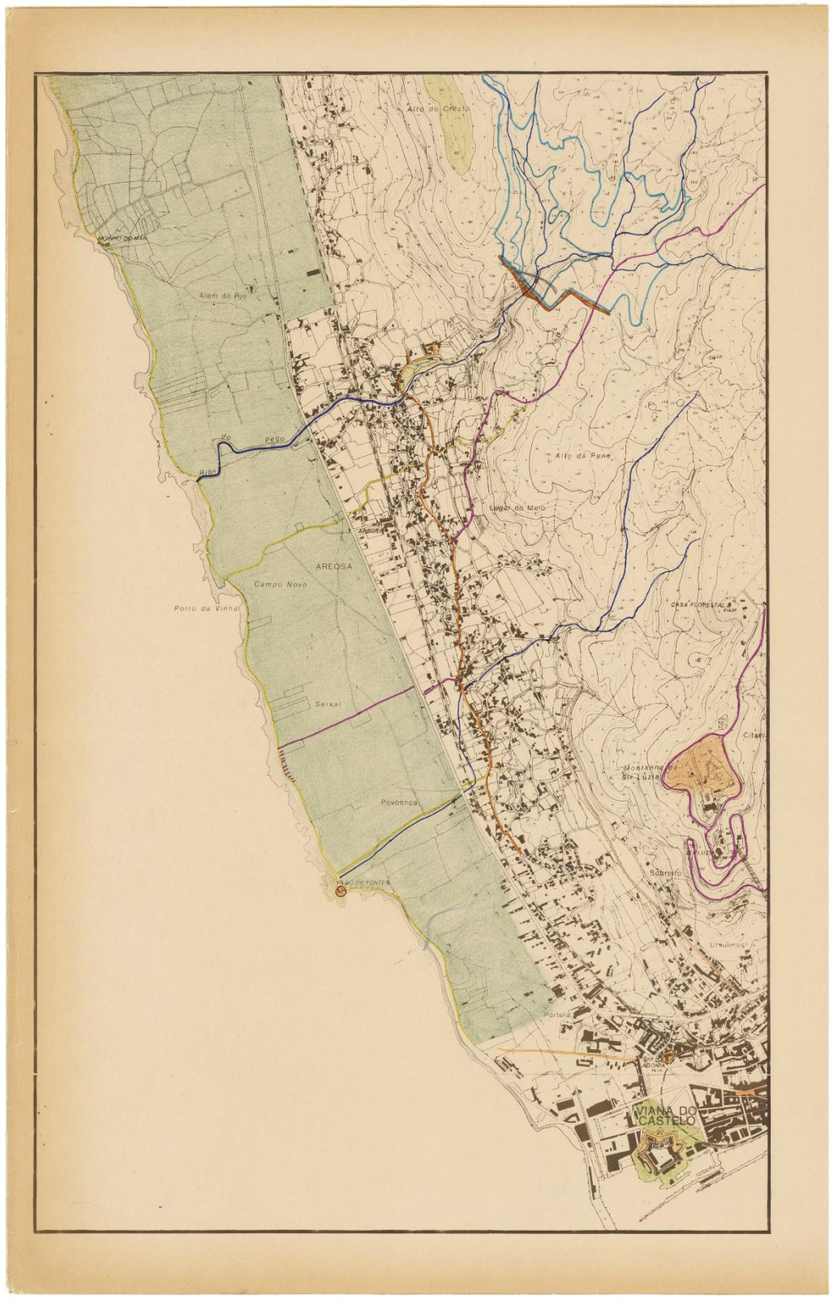
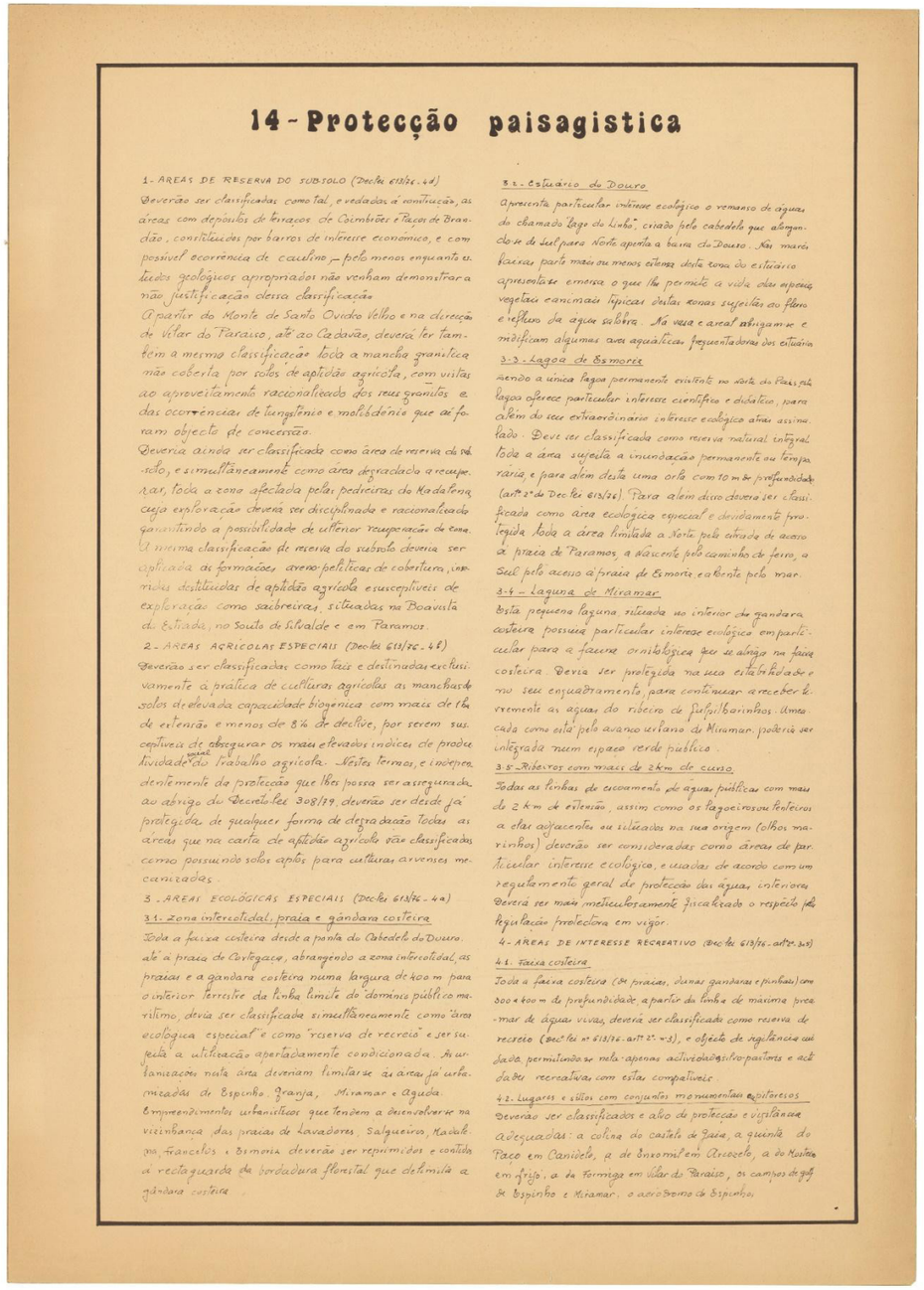



**Figure 11** Landscape Planning/Protection Map (4/4) in Volume I produced by Araújo (1978). © SIPA – Sistema de Informação para o Património Arquitetónico, Portugal, used with permission



## 14 - Protecção paisagistica

1 - AREAS DE RESERVA DO SUBSOLO (Decreto 613/76 - art)

Deverão ser classificadas como tal, e vedadas à construcção, as áreas com depósitos de terraços de Coimbrões e Facos de Bravidão, constituidos por barros de interesse economico, e com possivel ocorrencia de caulino — pelo menos enquanto estudos geologicos apropriados não venham demonstrar a não justificação dessa classificação.

A partir do Monte de Santo Ovidio Velho e na direcção de Vilar do Paraiso, até ao Cadavão, deveria ter também a mesma classificação toda a mancha granitica não coberta por solos de aptidão agricola, com vistas ao aproveitamento racionalizado dos seus granitos e das ocorrencias de tungsténio e molibdénio que aí foram objecto de concessão.

Deveria ainda ser classificada como área de reserva do subsolo, e simultaneamente como área degradada a recuperar, toda a zona afectada pelas pedreiras do Nadaforra cuja exploração deverá ser disciplinada e racionalizada garantindo a possibilidade de ulterior recuperação da zona.

A mesma classificação de reserva do subsolo deveria ser aplicada às formações aveno-politicas de cobertura, inaptas destituidas de aptidão agricola e susceptiveis de exploração como saibreiras, situadas na Boavista de Estrada, no Souto de Silvalde e em Paramos.

2 - AREAS AGRICOLAS ESPECIAIS (Decreto 613/76 - art)

Deverão ser classificadas como tais e destinadas exclusivamente à pratica de culturas agricolas as manchas de solos de elevada capacidade biogenica com mais de 1% de extensão e menos de 8% de declive, por serem susceptiveis de abegurar os mais elevados indices de produtividade do trabalho agricola. Nestes termos, e independentemente da protecção que lhes possa ser assegurada ao abrigo do Decreto-Lei 308/79, deverão ser desde já protegidas de qualquer forma de degradação todas as áreas que na carta de aptidão agricola vão classificadas como possuindo solos aptos para culturas arvenses mecanizadas.

3 - AREAS ECOLÓGICAS ESPECIAIS (Decreto 613/76 - art)

3.1 - Zona intercotidal, praia e gândara costeira

Toda a faixa costeira desde a ponta do Cabedelo do Douro até à praia de Carreçeira, abrangendo a zona intercotidal, as praias e a gandara costeira numa largura de 400 m para o interior terrestre da linha limite do dominio público maritimo, devia ser classificada simultaneamente como "área ecologica especial" e como "reserva de recreio" e ser sujeita a utilização aperfeiçoadamente condicionada. As urbanizações nesta área deveriam limitar-se às áreas já urbanizadas de Espinho, Granja, Miramar e Aguda.

Empreendimentos urbanisticos que tendem a desenvolver-se na vizinhança das praias de Lavadores, Salgueiros, Madalena, Francelos e Birmonia deverão ser reprimidos e contido a rectaguarda da bordadura florestal que delimita a gândara costeira.

3.2 - Estuario do Douro

Apresenta particular interesse ecologico o remanso de águas do chamado "Lago do Linho", criado pelo cabedelo que alongando-se de sul para Norte aperta a barra do Douro. Nas marés baixas parte mais ou menos extensa desta zona do estuario apresenta-se emersa o que lhe permite a vida das especies vegetais e animais tipicas destas zonas sujeitas ao fluxo e refluxo da agua salgada. Na vasa e areal abrigam-se e medificam algumas aves aquaticas frequentadoras dos estuários.

3.3 - Lagoa de Esmoriz

Sendo a unica lagoa permanente existente no norte do País esta lagoa oferece particular interesse cientifico e didatico, para além do seu extraordinario interesse ecologico atrás assinalado. Deve ser classificada como reserva natural integral toda a área sujeita a inundação permanente ou temporaria, e para alem desta uma orla com 10 m de profundidade (art 2º do Dec-Lei 613/76). Para alem disto deveria ser classificada como área ecologica especial e devidamente protegida toda a área limitada a Norte pelo estrada de acesso à praia de Paramos, a Nascente pelo caminho de ferro, a Sul pelo acesso à praia de Esmoriz e a Poente pelo mar.

3.4 - Laguna de Miramar

Esta pequena laguna situada no interior da gandara costeira possuia particular interesse ecologico em particular para a fauna ornitologica que se abriga na faixa costeira. Devia ser protegida na sua estabilidade e no seu enquadramento para continuar a receber livremente as aguas do ribeiro de Silgalhariinhos. Urbanizada como está pelo avanço urbano de Miramar, poderia ser integrada num espaço verde publico.

3.5 - Ribeiros com mais de 2 km de curso

Todas as linhas de escoamento de aguas publicas com mais de 2 km de extensão, assim como os lagoeiros ou terrenos a elas adjacentes ou situados na sua origem (olhos marinhos) deverão ser consideradas como áreas de particular interesse ecologico, e usadas de acordo com um regulamento geral de protecção das aguas interiores. Deverá ser mais meticulosamente fiscalizado o respeito pela legislação protectora em vigor.

4 - AREAS DE INTERESSE RECREATIVO (Decreto 613/76 - art 2º n.3)

4.1. Faixa costeira

Toda a faixa costeira (as praias, dunas gandaras e pinhais) com 500 a 600 m de profundidade, a partir da linha de maxima preia-mar de aguas vivas, devia ser classificada como reserva de recreio (Dec-Lei nº 613/76 - art 2º n.3), e objecto de vigilancia cuidada, permitindo-se nela apenas actividades ao ar livre passivas e actividades recreativas com estas compativeis.

4.2. Lugares e sitios com conjuntos monumentais e pitorescos

Deverão ser classificados e alvo de protecção e vigilancia adequadas: a colina do castelo de Faria, a quinta do Paço em Canidelo, a de Sant'Ana em Arcozelo, a do Mosteiro em Grijó, a da Formiga em Vilar do Paraiso, os campos de golf de Espinho e Miramar, o aeroporto de Espinho.

**Figure 12** Chapter Landscape Planning/Protection in Volume V produced by Araújo (1978). © SIPA – Sistema de Informação para o Património Arquitetónico, Portugal, used with permission

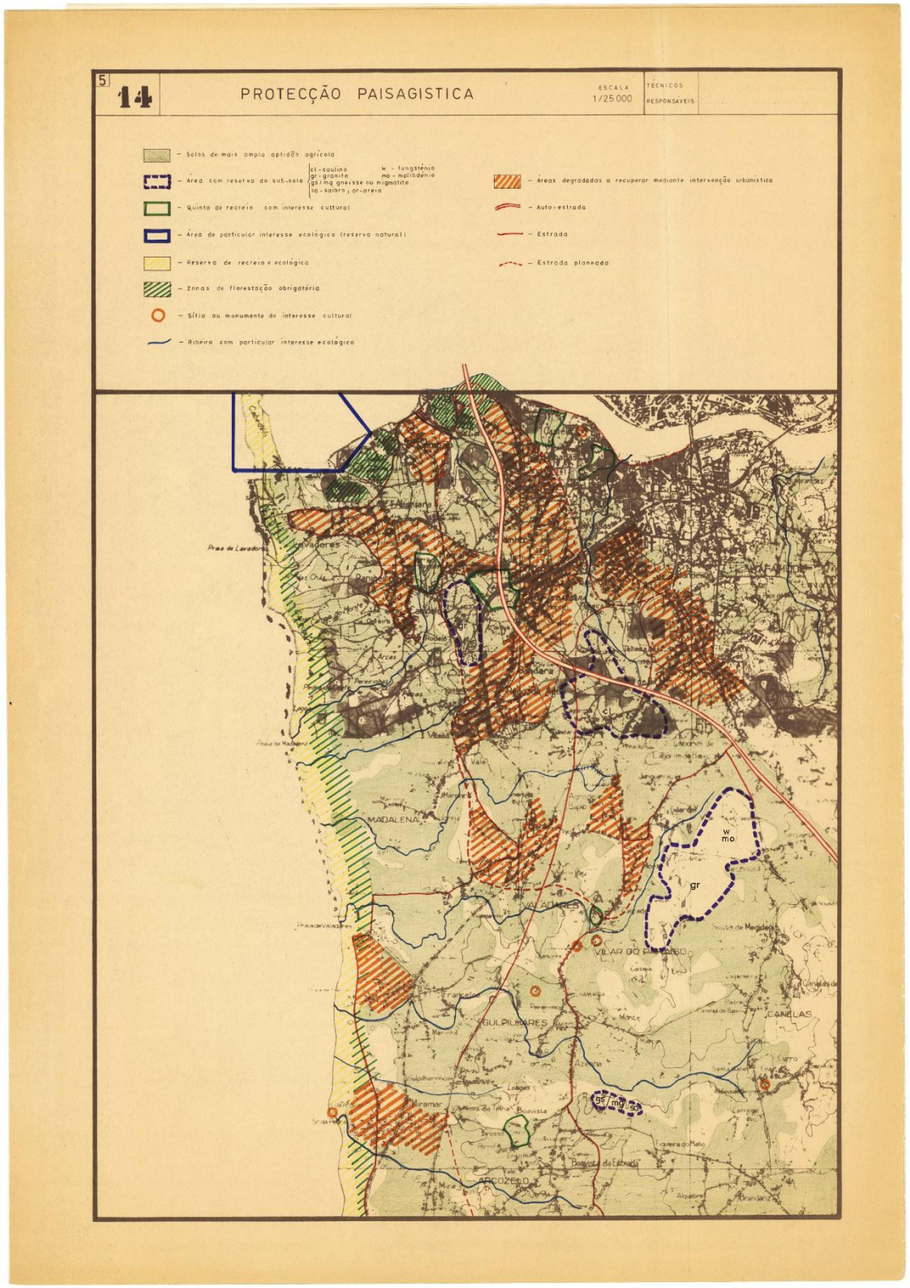



**Figure 13** Landscape Planning/Protection Map (1/2) in Volume V produced by Araújo (1978). © SIPA – Sistema de Informação para o Património Arquitetónico, Portugal, used with permission

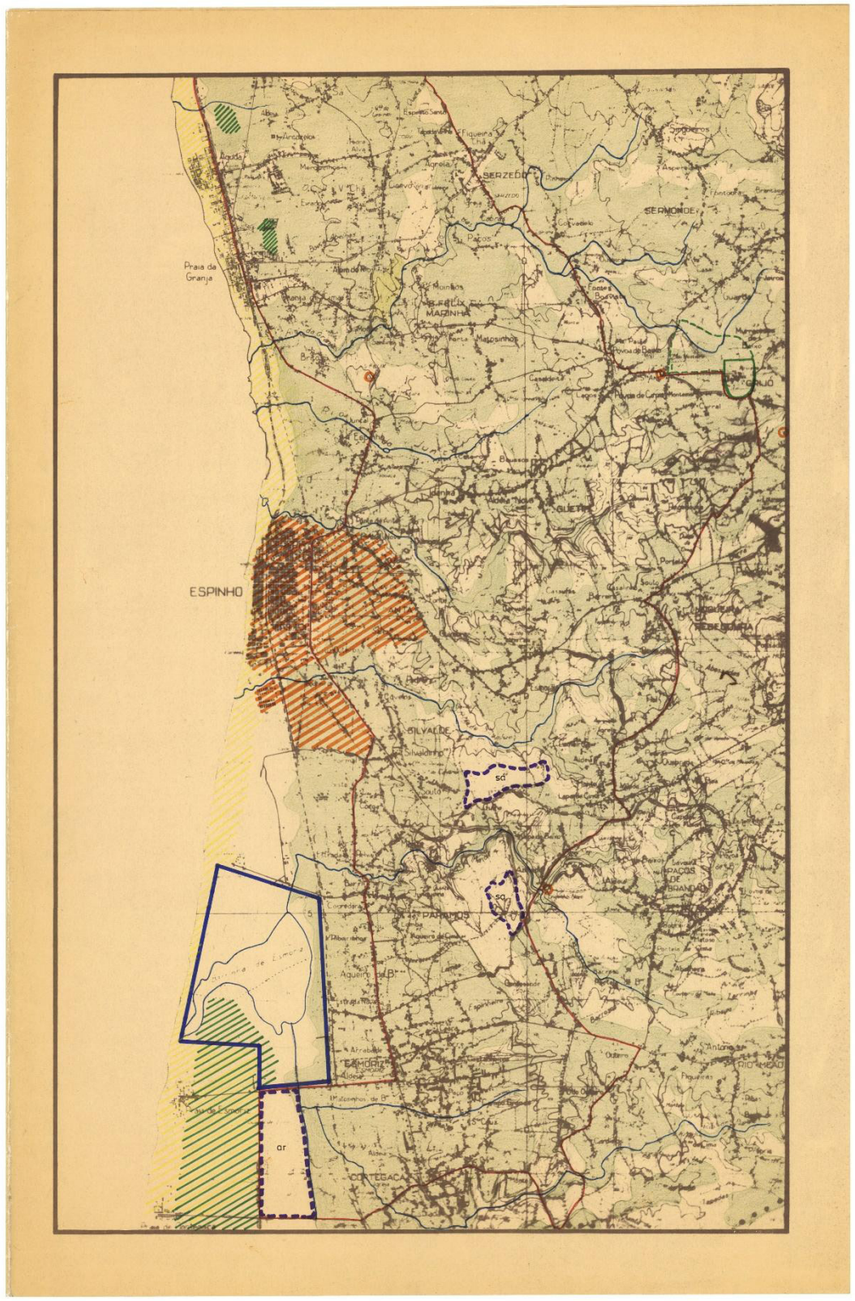



**Figure 14** Landscape Planning/Protection Map (2/2) in Volume V produced by Araújo (1978). © SIPA – Sistema de Informação para o Património Arquitetónico, Portugal, used with permission

**Table 10** Landscape Planning/Protection Categories and Subcategories in Volume I - Minho to Lima of the study "Landscape recognition of the coastal zone between Caminha and Cortegaça"

| **Landscape recognition of the coastal zone between Caminha and Cortegaça**<br>**Volume I. Landscape recognition of the coastal zone from Minho to Lima**<br>**Text – Landscape Protection and Map – Landscape Planning** | | | | | |
|---|---|---|---|---|---|
| **Category** | **Reference** | **Description (Text)** | | **Subcategory** | **Description (text)** |
| 1. Coastal rocks | Legend | Not available | | Not applicable | Not applicable |
| 2. Sandy beaches | Legend | Not available | | Not applicable | Not applicable |
| 3. Dunes | Legend | Not available | | Not applicable | Not applicable |
| 4. Coastal heath and inland | Legend | Not available | | Not applicable | Not applicable |
| 5. Ecological protection tree curtain (existing or to be created) | Legend | Not available | | Not applicable | Not applicable |
| 6. Protection forest (soil protection) or regeneration forest (existing or to be created) | Legend | Not available | | Not applicable | Not applicable |
| 7. Special agricultural areas<br>(Decree-Law 613/76-article 4, b) | Legend<br>Text | They possess unusual social value and should therefore be protected and restricted from any form of use that would degrade their agricultural capability. This applies to all areas where the presence of agricultural suitability soils has been indicated by the SROA on the 'general outline of agricultural planning' map, drawn at a scale of 1:25,000, and identified by the letter A. | | Not applicable | Not applicable |
| 8. Special ecological areas (Decree-Law 613/76-article 4, a) | Legend | Not available | | Not available | Not available |
| | Text | Not available | | 8.1. Minho River estuary and marshes at the mouth of the Coura River | Not available. It only describes the area to be protected or presents measures. |
| | | | | 8.2. Estuary of the Âncora River and its marsh | |
| | | | | 8.3. Streams with more than 2 km of course | |
| | | | | 8.4. The primary dunes in the dune systems of the Camarido, Gelfa, and Carreço coasts | |
| | | | | 8.5. All tree formations existing within 500 meters of the high tide line | |
| | | | | 8.6. Cisto-Ulicetum humilis heathland | |
| 9. Nature reserves (Decree-Law 613/76-article 4, a) | Legend | Not available | | Not applicable | Not applicable |
| | Text | Not available | | 9.1. Gelfa heathland | Not available. It only describes the area to be protected or presents measures. |
| | | | | 9.2. Dunes of Afife | |
| | | | | 9.3. Montedor heathland | |

| | | | | | |
|---|---|---|---|---|---|
| 10. Recreational reserves (Decree-Law 613/76- article 2º, n.º 3) | Legend | It should be considered and managed as such, i.e. as "areas particularly suited to meeting the needs of urban populations in terms of active or passive recreation" | | 10.1. The entire coastal strip of sandy and rocky beaches and the contiguous strip of dry land up to 200 meters from the highest high-tide line of spring tides, as well as the intertidal maritime zone, except for cultivated areas on dry land. | Not available |
| | | | | 10.2. Estuaries and navigable rivers and their respective banks to a depth of 10 meters | Not available |
| | | | | 10.3. Non-navigable rivers and their banks, extending 2 meters beyond the winter bed adjacent to cultivated lands, or 5 meters in other areas. | Not available |
| | | | | 10.4. The pedestrian route from Viana to Caminha along the coast, passing from castle to castle. | Not available |
| | | | | 10.5. The ancient medieval road from Viana to Caminha along the slopes of the Santa Luzia and Santo Antão Mountains. | Not available |
| 11. Places or sites to be classified and protected | Legend | (Check 11. Classified places, sites and groups (Decree-Law 613/76-article 5) | | | |
| 11.1. Properties or ensembles classified or to be classified and protected | Legend | (Check 11. Classified places, sites and groups (Decree-Law 613/76-article 5) | | | |
| 11.2. Urban intervention circles | Legend | (Check 12. Urban intervention areas) | | | |

| | | | | | |
|---|---|---|---|---|---|
| 11. Classified places, sites and groups (Decree-Law 613/76-article 5) | Text | The town of Caminha within the sixteenth-century walls and the area of the old moats | | Not applicable | Not applicable |
| | | The city of Viana do Castelo in the part located south of Avenida do Atlântico and EN 13 | | Not applicable | Not applicable |
| | | Mount Santo Antão above the 350m contour line. | | Not applicable | Not applicable |
| | | The Calvary of Vila Praia de Âncora and the surrounding area within a 100m radius around the Chapel of S. Salvador. | | Not applicable | Not applicable |
| | | The surrounding area of Convento de Cabanas within a 100m radius around the existing cross on the third front.<br><br>4. The hill of Cividade de Afife, above the 140m contour line. | | Not applicable | Not applicable |
| | | The artistic and rustic ensemble formed by the house and chapel of Senhora da Boa Viagem and the banks of the Pego stream upstream of the bridge on the municipal access road, extending 500m along each bank and 100m deep. | | Not applicable | Not applicable |
| | | Mount Santa Luzia in Viana do Castelo, including the citadel, the Santa Luzia temple, the hotel and its outdoor facilities, the "Paços" trail, elevator, and access road to the hotel from the junction on EN13. | | Not applicable | Not applicable |
| | | The old road from Viana to Caminha, passing through the villages on the slopes of Serra de Santa Luzia. | | Not applicable | Not applicable |
| | | Coastal path or trail connecting the 6 coastal defense forts from S. Tiago da Barra to Caminha. | | Not applicable | Not applicable |
| | | Ruins of the convent of S. Mamede. | | Not applicable | Not applicable |
| | | National road EN13 from Viana to Caminha. | | Not applicable | Not applicable |
| | | Panoramic setting of the railway between Viana and Caminha. | | Not applicable | Not applicable |

| | | | | | |
|---|---|---|---|---|---|
| | | | | (centers of basic services) | Considering it sufficient for the coastal populations to have three centers of basic services (education, health, culture, recreation, social security, supply) in Caminha, Vila Praia de Âncora, and Viana, urban expansion interventions should be concentrated in these three localities, and in areas of urban renewal and expansion correctly selected based on the normal requirements of social efficiency, regional support capacity, and cost economy of installation and operation. |
| 12. Urban intervention areas | Legend<br><br>Text | Not available | | (1km clusters) | The management of the existing rural habitat should be conducted in such a way as to lead—over the medium term—to a more rational structuring into five clusters within circles of a 1 km radius, so they can benefit (under economically viable conditions) from some basic infrastructures (electricity and water at home, collective sewage systems, automobile access, and mail distribution). The following clusters are proposed:<br><br>1. Cristelo - Moledo - Santana<br><br>2. Âncora - Lage, Viso<br><br>3. Afife<br><br>4. Paço - Montedor - Carreço<br><br>5. Areosa - Povoença - Portela<br><br>The first cluster would be a satellite of Caminha, the second and third would be satellites of Vila Praia de Âncora, and the fourth and fifth of Viana do Castelo.<br><br>The clusters mentioned in the previous paragraph should be reserved as much as possible for farmers (agricultural entrepreneurs operating within a 5km radius), tourist facilities, and rental residences for vacationers and tourists (making the most of the existing architectural heritage). |
| | | | | (Touristic facilities) | For the implementation of new tourist facilities (including new rental accommodations for tourists), the following areas are recommended:<br><br>1. On the slopes of Monte de Santo Antão, from Souto (Cristelo) to Inagda, passing through Sinal, Gateira, and Tostado, within the Moledo nucleus (easing the pressure of new constructions on San'Ana, on EN13, and on the agricultural habitat of Moledo).<br><br>2. Southwest of Lage within the Âncora-Lage-Viso nucleus.<br><br>3. Between Bandeira and Cutelo within the Afife nucleus.<br><br>4. Between Carreço and Paçô within the Carreço nucleus.<br><br>5. On the slopes of Serra de Santa Luzia, east of the railway, within the Areosa-Povoença-Portela nucleus. |
| 12.1. Roads of recreational interest | Legend | Not available | | Not applicable | Not applicable |
| 12.2. Hiking trails of interest | Legend | Not available | | Not applicable | Not applicable |

| **Landscape recognition of the coastal zone between Caminha and Cortegaça**<br>**Volume I. Landscape recognition of the coastal zone from Minho to Lima**<br>**Text – Landscape Protection and Map – Landscape Planning** | | | | | |
|---|---|---|---|---|---|
| 12.3. Viewpoints with panoramas of particular recreational effect | Legend | Not available | | Not applicable | Not applicable |
| 13. Underground Reserve Areas (Decree-Law 613/76- article 4, d) | Text | Although no indisputable 'subsoil reserve' areas are indicated in the studied zone (...), it is considered that attention should be given to the headwaters of Caminha and Afife, where, in light of this, urban development projects should not be encouraged. | | Not applicable | Not applicable |
| 14. Protected landscapes<br><br>(Decree-Law 613/76- article 2, n. 4) | Text | The entire coastal strip, from the Minho estuary to the Lima estuary, considered in the present study, must be given particular care and protection, both by the local and central administration, in view of its exceptional economic interest (agricultural, fishing, recreational, tourist, and cultural). | | Not applicable | Not applicable |
| 15. Natural Park (Decree-Law 613/76- article 2, n. 6) | Text | The entire coastal strip should be managed "with a view to recreation, nature conservation, landscape protection, and the promotion of rural and urban populations," as recommended in this chapter. Given the potential of the area, and knowing that similar conditions are found to a more or less developed degree along almost the entire coast from Caminha to Cortegaça, we believe that the entire coastal strip deserves to be designated as a Natural Park. | | Not applicable | Not applicable |
| 16. Degraded areas to be restored<br><br>(Decree-Law 613/76- article 2, n. 6) | Text | Panoramic setting of the railway on the exit from Viana heading north | | Not applicable | Not applicable |
| | | Panoramic setting of the EN13 on the exit from Viana to Caminha, and in the crossings of Carreço, Afife, Âncora, and Moledo | | | |
| | | In the Areosa plain, long-term demolition of buildings built on the West side of the EN13 to the North of Portela | | | |
| | | In the Carreço dune, long-term demolition of buildings, and reintegration of some | | | |
| | | On the Montedor hill, in the vicinity of Forte do Cão, near the access road to the Gelfa Sanatorium, in the Afife dunes, and in other areas of great scenic interest, buildings are emerging whose demolition will be demanded by all those who insist on respecting landscape quality | | | |

**Table 11** Landscape Planning/Protection Categories and Subcategories in Volume V - Douro to Cortegaça of the study "Landscape recognition of the coastal zone between Caminha and Cortegaça"

| **Landscape recognition of the coastal zone between Caminha and Cortegaça**<br>**Volume V. Landscape recognition of the coastal zone from Douro to Cortegaça**<br>**Text – Landscape Protection and Map – Landscape Protection** | | | | | |
|---|---|---|---|---|---|
| **Category** | **Reference** | **Description (Text)** | | **Subcategory** | **Description (text)** |
| 1. Soils with the highest agricultural suitability | Legend | Areas with soils of high biogenic capacity, exceeding 1 hectare in size and with less than 8% slope, should be classified as such and exclusively allocated for agricultural cultivation, as they are likely to ensure the highest indices of social productivity in agricultural work. | | Not applicable | Not applicable |
| 1. Special agricultural areas (Decree-Law 613/76-article 4, b) | Text | | | Not applicable | Not applicable |
| 2. Underground Reserve Areas (Decree-Law 613/76- article 4, d) | Legend<br>Text | Areas with occurrences of economically valuable mineral resources (...)<br><br>Prohibited from construction (...)<br><br>not covered by soil of high agricultural suitability (...) Area reserved for exploitation or for landscape restoration | | Not applicable | Not applicable |
| 3. Recreational (historical) farm with cultural interest | Legend | Not available | | Not applicable | Not applicable |
| 4. Area of particular ecological interest (nature reserve) | Legend | Not available | | Not applicable | Not applicable |
| 4. Special ecological areas<br><br>(Decree-Law 613/76-article 4, a) | Text | Not available | | 4.1. Intertidal zone, beach, and coastal dune system | The intertidal zone, beaches, and coastal dune system up to 400 meters inland from the boundary of the "maritime public domain" should be classified simultaneously as a "special ecological area" and as a "recreation reserve," subject to tightly controlled use. |
| | | | | 4.2. Douro river estuary | The calm waters of the so-called 'Linho Lake,' created by the sandbar extending from South to North and narrowing the mouth of the Douro River, present particular ecological interest. |
| | | | | 4.3. Esmoriz Lagoon | As the only permanent lagoon in the North of the country, this lagoon offers particular scientific and educational interest, in addition to its extraordinary ecological significance. The entire area subject to permanent or temporary flooding should be classified as an integral nature reserve, with a surrounding strip 10 meters deep. Additionally, the entire area bordered to the North by the access road to Paramos beach, to the East by the railway, to the South by the access to Esmoriz beach, and to the West by the sea should be classified as a special ecological area and properly protected. |
| | | | | 4.4. Miramar Lagoon | This small lagoon, located within the coastal dune system, possesses particular ecological interest, especially for the bird fauna that takes refuge in the coastal strip... Threatened as it is by the urban expansion of Miramar, it could be integrated into a public green space. |
| | | | | 4.5. Streams with more than 2 km of course | All public watercourses longer than 2 km, as well as the adjacent ponds or springs located at their source (spring eyes), should be considered areas of particular ecological interest and used in accordance with a general regulation for the protection of inland waters. |

| **Landscape recognition of the coastal zone between Caminha and Cortegaça**<br>**Volume V. Landscape recognition of the coastal zone from Douro to Cortegaça**<br>**Text – Landscape Protection and Map – Landscape Protection** | | | | | |
|---|---|---|---|---|---|
| 5. Ecological recreation reserve (Decree-Law 613/76- article 2º, n.º 3 and 5) | Legend | Not available | | Not available | Not available |
| | Text | Not available | | 5.1. Coastal strip | All the coastal strip (comprising beaches, dunes, coastal heathlands, and pine forests) with a depth of 300 to 400 meters from the high tide line should be classified as a recreational area and subject to careful monitoring, allowing only silvo-pastoral activities and recreational activities compatible with these uses. |
| | | | | 5.2. Places and sites with monumental or picturesque ensembles | These areas should be classified and subject to appropriate protection and monitoring. |
| 6. Mandatory afforestation zones | Legend | Not available | | Not applicable | Not applicable |
| 7. Site or monument of cultural interest | Legend | [according to the text, it is included in the category "Ecological recreation reserve", Subcategory 5.2] | | Not applicable | Not applicable |
| 8. Stream with particular ecological interest | Legend | [according to the text, it is included in category "Special ecological areas ", subcategory 4.5] | | Not applicable | Not applicable |
| 9. Degraded areas to be restored through urban intervention. | Legend | Not available | | Not applicable | Not applicable |

**Table 12** Comparison of Landscape Planning/Protection Categories and Subcategories in Volume I (Minho to Lima) versus Volume V (Douro to Cortegaça) of the study "Landscape recognition of the coastal zone between Caminha and Cortegaça"

| **Volume I. Landscape recognition of the coastal zone from Minho to Lima**<br>**Text – Landscape Protection and Map – Landscape Planning** | | | **Volume V. Landscape recognition of the coastal zone from Douro to Cortegaça**<br>**Text – Landscape Protection and Map – Landscape Protection** | |
|---|---|---|---|---|
| **Category** | **Subcategory** | | **Category** | **Subcategory** |
| 1. Coastal rocks | | | | |
| 2. Sandy beaches | | | | |
| 3. Dunes | | | | |
| 4. Coastal heath and inland | | | | |
| 5. Ecological protection tree curtain (existing or to be created) | | | | |
| 6. Protection forest (soil protection) or regeneration forest (existing or to be created) | | | 6. Mandatory afforestation zones | |
| 7. Special agricultural areas<br>(Decree-Law 613/76-article 4, b) | | | 1. Soils with the highest agricultural suitability<br>1. Special agricultural areas (Decree-Law 613/76-article 4, b) | |
| 8. Special ecological areas<br>(Decree-Law 613/76-article 4, a) | 8.1. Minho River estuary and marshes at the mouth of the Coura River | | 4. Special ecological areas<br>(Decree-Law 613/76-article 4, a) | 4.1. Intertidal zone, beach, and coastal dune system |
| | 8.2. Estuary of the Âncora River and its marsh | | | 4.2. Douro river estuary |
| | 8.3. Streams with more than 2 km of course | | | 4.3. Esmoriz Lagoon |
| | 8.4. The primary dunes in the dune systems of the Camarido, Gelfa, and Carreço coasts | | | 4.4. Miramar Lagoon |
| | 8.5. All tree formations existing within 500 meters of the high tide line | | | 4.5. Streams with more than 2 km of course |
| | 8.6. Cisto-Ulicetum humilis heathland | | | |
| 9. Nature reserves (Decree-Law 613/76-article 2) | 9.1. Gelfa heathland | | 4. Area of particular ecological interest (nature reserve) | |
| | 9.2. Dunes of Afife | | | |
| | 9.3. Montedor heathland | | | |
| 10. Recreational reserves (Decree-Law 613/76- article 2º, n.º 3) | 10.1. The entire coastal strip of sandy and rocky beaches and the contiguous strip of dry land up to 200 meters from the highest high-tide line of spring tides, as well as the intertidal maritime zone, except for cultivated areas on dry land | | 5. Ecological recreation reserve (Decree-Law 613/76- article 2º, n.º 3 and 5) | 5.1. Coastal strip |
| | 10.2. Estuaries and navigable rivers and their respective banks to a depth of 10 meters | | | 5.2. Places and sites with monumental or picturesque ensembles |
| | 10.3. Non-navigable rivers and their banks, extending 2 meters beyond the winter bed adjacent to cultivated lands, or 5 meters in other areas | | | |
| | 10.4. The pedestrian route from Viana to Caminha along the coast, passing from castle to castle | | | |
| | 10.5. The ancient medieval road from Viana to Caminha along the slopes of the Santa Luzia and Santo Antão Mountains | | | |

| Volume I. Landscape recognition of the coastal zone from Minho to Lima<br>Text – Landscape Protection and Map – Landscape Planning | | | Volume V. Landscape recognition of the coastal zone from Douro to Cortegaça<br>Text – Landscape Protection and Map – Landscape Protection | |
|---|---|---|---|---|
| **Category** | **Subcategory** | | **Category** | **Subcategory** |
| 11. Places or sites to be classified and protected | | | 3. Recreational (historical) farm with cultural interest | |
| 11.1. Properties or ensembles classified or to be classified and protected | | | 7. Site or monument of cultural interest | |
| 11.2. Urban intervention circles | | | | |
| 11. Classified places, sites and groups (Decree-Law 613/76-article 5) | The town of Caminha within the sixteenth-century walls and the area of the old moats | | | |
| | The city of Viana do Castelo in the part located south of Avenida do Atlântico and EN 13 | | | |
| | Mount Santo Antão above the 350m contour line. | | | |
| | The Calvary of Vila Praia de Âncora and the surrounding area within a 100m radius around the Chapel of S. Salvador. | | | |
| | The surrounding area of Convento de Cabanas within a 100m radius around the existing cross on the third front.<br><br>4. The hill of Cividade de Afife, above the 140m contour line. | | | |
| | The artistic and rustic ensemble formed by the house and chapel of Senhora da Boa Viagem and the banks of the Pego stream upstream of the bridge on the municipal access road, extending 500m along each bank and 100m deep. | | | |
| | Mount Santa Luzia in Viana do Castelo, including the citadel, the Santa Luzia temple, the hotel and its outdoor facilities, the "Paços" trail, elevator, and access road to the hotel from the junction on EN13. | | | |
| | The old road from Viana to Caminha, passing through the villages on the slopes of Serra de Santa Luzia. | | | |
| | Coastal path or trail connecting the 6 coastal defense forts from S. Tiago da Barra to Caminha. | | | |
| | Ruins of the convent of S. Mamede. | | | |
| | National road EN13 from Viana to Caminha. | | | |
| | Panoramic setting of the railway between Viana and Caminha. | | | |
| 12. Urban intervention areas | (centers of basic services) | | 9. Degraded areas to be restored through urban intervention. | |
| | (1km clusters) | | | |
| | (Touristic facilities) | | | |
| 12.1. Roads of recreational interest | | | | |

| Volume I. Landscape recognition of the coastal zone from Minho to Lima<br>Text – Landscape Protection and Map – Landscape Planning | | | Volume V. Landscape recognition of the coastal zone from Douro to Cortegaça<br>Text – Landscape Protection and Map – Landscape Protection | |
|---|---|---|---|---|
| **Category** | **Subcategory** | | **Category** | **Subcategory** |
| 12.2. Hiking trails of interest | | | | |
| 12.3. Viewpoints with panoramas of particular recreational effect | | | | |
| | | | | |
| 13. Underground Reserve Areas (Decree-Law 613/76- article 4, d) | | | 2. Underground Reserve Areas (Decree-Law 613/76- article 4, d) | |
| 14. Protected landscapes<br><br>(Decree-Law 613/76- article 2, n. 4) | The entire coastal strip, from the Minho estuary to the Lima estuary | | | |
| 15. Natural Park (Decree-Law 613/76- article 2, n. 6) | The entire coastal strip from Caminha to Cortegaça | | | |
| 16. Degraded areas to be restored<br><br>(Decree-Law 613/76- article 2, n. 6) | Panoramic setting of the railway on the exit from Viana heading north | | | |
| | Panoramic setting of the EN13 on the exit from Viana to Caminha, and in the crossings of Carreço, Afife, Âncora, and Moledo | | | |
| | In the Areosa plain, long-term demolition of buildings built on the West side of the EN13 to the North of Portela | | | |
| | In the Carreço dune, long-term demolition of buildings, and reintegration of some | | | |
| | On the Montedor hill, in the vicinity of Forte do Cão, near the access road to the Gelfa Sanatorium, in the Afife dunes, and in other areas of great scenic interest, buildings are emerging whose demolition will be demanded by all those who insist on respecting landscape quality | | | |
| | | | 8. Stream with particular ecological interest | |

**Table 13** Description of the categories and subcategories of the Decree-Law 613/76

| **Decree-Law 613/76 - New nature protection regime and creation of national parks** | | |
|---|---|---|
| **Categories** | **Subcategories** | **Description** |
| Integral nature reserves and national parks | Integral nature reserves | Where protection concerns all aspects of Nature, preventing any action that alters the dynamics of the respective ecosystems and where human presence is only permitted for administrative or scientific reasons. |
| | National parks | A set of reserves established for the protection of Nature and the education of the population. The national park may contain integral and partial nature reserves surrounded by areas of protection and recreation. The presence of human establishments is only possible under particular conditions and as facilities. |
| Partial nature reserve | Not applicable | Where efforts are made to safeguard certain well-defined aspects of Nature, whether concerning its fauna, flora, soil, geology, or water resources, by taking appropriate measures that allow for their protection, scientific study, and use. Thus, biological, botanical, zoological (ornithological and others), geological, aquatic, and marine nature reserves can be established. |
| Recreation reserve | Not applicable | This corresponds to what has sometimes been referred to as a tourist reserve, as tourism is considered to be the commercialisation of recreation, which is the use of leisure time by workers from any sector.<br><br>In this classification, areas particularly suited to meeting the recreational needs of urban populations, whether active or passive, are considered. These areas emphasise recreational and scenic functions, among others, while still taking into account concerns for the protection of the natural environment and ecological balance. |
| Protected landscape | Not applicable | This corresponds to what has sometimes been referred to as a landscape reserve. The aim is to safeguard rural or urban areas where characteristic aspects of the culture and habits of the people still exist, as well as in constructions and the design of spaces. The continuation of certain activities (agriculture, grazing, handicrafts, etc.) is promoted, supported by controlled recreation aimed at the social, cultural, and economic promotion of the resident populations, in which these populations actively and consciously participate. |
| Classified places, sites, ensembles, and objects | Not applicable | This involves defining areas and measures essential for the landscape conservation of specific natural and/or built occurrences of cultural, scientific, technical, or other interest. These may include villages, rural settlements, archaeological sites, ruins, distinctive landforms, rock formations, isolated or grouped trees, and characteristic ecological communities. |
| Natural Parks | Not applicable | They are areas of territory, properly organised, aimed at recreation, nature conservation, landscape protection, and promotion of rural populations, which may encompass both public and private property, where zoning establishes the capabilities and uses of different land parcels.<br><br>The natural park may encompass one or more areas with the different types previously mentioned, which are integrated into a functional structure with specific regulations included in the overall regulation. |
| Areas that specially ensure the biological balance of the regional landscape | Special Ecological Areas | Areas of high ecological value, both in terms of productivity and the nature and quality of the products, in which the maintenance of fertility and the capacity for renewal of natural resources and which guarantee the biological balance of the regional landscape must be ensured. |
| | Special Agricultural or Forestry Areas | Areas of high agricultural or forestry value, both in terms of the biomass produced and the nature and quality of the products, where the maintenance of fertility should be ensured. They are, therefore, areas where certain agricultural and forestry developments are a priority, and which guarantee the biological balance of the regional landscape. |
| | Degraded Areas to be Rehabilitated | Areas where the soil or vegetation has been destroyed and require special measures for their restoration with a view to utilisation to be determined by national and regional programme. |
| | Underground Reserve Areas | Areas with available resources, minerals or aquifers, in the subsoil, which it is important to safeguard for appropriate use. |

**Table 14** Proposal of possible harmonisation of categories and subcategories for the study "Landscape recognition of the coastal zone between Caminha and Cortegaça"

| Categories | Subcategories |
|---|---|
| Recreation reserves | The entire coastal strip of sandy and rocky beaches and the contiguous strip of dry land up to 200 meters from the highest high-tide line of spring tides, as well as the intertidal maritime zone, except for cultivated areas in dry land |
| | Estuaries and navigable rivers and their respective banks to a depth of 10 meters |
| | Non-navigable rivers and their banks, extending 2 meters beyond the winter bed adjacent to cultivated lands, or 5 meters in other areas |
| | Pedestrian routes |
| | Historical routes and roads of recreational interest |
| | Viewpoints with panoramas of particular recreational effect |
| | Places and sites with monumental or picturesque ensembles |
| Protected landscapes | The entire coastal strip from the Minho estuary to the Lima estuary |
| | The available information does not allow us to conclude whether the author would propose other protected landscapes |
| Classified places, sites, ensembles, and objects | Sites or monuments of cultural interest |
| | Recreational (historical) farms with cultural interest |
| Natural Parks | The entire coastal strip from Caminha to Cortegaça |
| Special Ecological Areas<br><br>[some areas could also be classified as a integral or partial nature reserve] | Estuary and their marshes |
| | Streams with more than 2km of course |
| | Coastal lagoons |
| | Dunes |
| | Beaches |
| | Coastal rocks |
| | Coastal heath – Cisto-Ulicetum humilis |
| Special Agricultural Areas | Soils with the highest agricultural suitability |
| Special Forest Areas | All tree formations existing within 500 meters of the high tide line / ecological protection tree curtain (existing or to be created) |
| | Mandatory afforestation areas (soil protection or soil regeneration) |
| Underground Reserve Areas | Underground Reserve Areas |
| Degraded Areas to be Rehabilitated | Landscape integration of panoramic roads |
| | Landscape integration of monuments and scenic spots |
| | Landscape integration of quarries, gravel pits, sandpits |
| | Landscape integration of infrastructure lines (energy, telecommunication) and their stations |
| | Demolitions (ecological and landscape sensitive areas) |
| | Areas with high levels of pollution (industrial areas, landfills and dumps, polluted stretch of water stream) |
| | Beach access points (roads and parking lots) |
| | Channelised watercourses |
| Urban intervention areas | Clusters 3km |
| | Clusters 1km |
| | Degraded areas to be restored through urban intervention |



**Table 15** Deduced Landscape Proposal Map for Vila do Conde, Póvoa de Varzim and Esposende based on Ilídio de Araújo vision

| Categories | Subcategories | Deduced Landscape Proposal for Vila do Conde, Póvoa de Varzim and Esposende |
|---|---|---|
| Recreation reserves | The entire coastal strip of sandy and rocky beaches and the contiguous strip of dry land up to 200 meters from the highest high-tide line of spring tides, as well as the intertidal maritime zone, except for cultivated areas in dry land | A 200-meter buffer, adjusted to exclude cultivated areas, has been included on the map to represent the recreation reserve along the coastline. |
| | Estuaries and navigable rivers and their respective banks to a depth of 10 meters | Due to the scale used in the map, these buffers are not represented. |
| | Non-navigable rivers and their banks, extending 2 meters beyond the winter bed adjacent to cultivated lands, or 5 meters in other areas | |
| | Pedestrian routes | Ilídio de Araújo does not identify these in the case studies, as the information he provided is incomplete and does not allow us to determine whether they would be included in his proposal. |
| | Historical routes and roads of recreational interest | |
| | Viewpoints with panoramas of particular recreational effect | |
| | Places and sites with monumental or picturesque ensembles | |
| Protected landscapes | The entire coastal strip from the Minho estuary to the Lima estuary | The area is not included in our case studies. |
| | The available information does not allow us to conclude whether the author would propose other protected landscapes | The available information does not allow us to conclude whether the author would propose other protected landscapes |

| Categories | Subcategories | Deduced Landscape Proposal for Vila do Conde, Póvoa de Varzim and Esposende |
|---|---|---|
| Classified places, sites, ensembles, and objects | Sites or monuments of cultural interest | Ilídio de Araújo does not identify these in the case studies, as the information he provided is incomplete and does not allow us to determine whether they would be included in his proposal. |
| | Recreational (historical) farms with cultural interest | |
| Natural Parks | The entire coastal strip from Caminha to Cortegaça | Category included in the deduced landscape proposal |
| Special Ecological Areas<br><br>[some areas could also be classified as a integral or partial nature reserve] | Estuary and their marshes | Category included in the deduced landscape proposal |
| | Streams with more than 2km of course | |
| | Coastal lagoons | |
| | Dunes | |
| | Beaches | |
| | Coastal rocks | |
| | Coastal heath – Cisto-Ulicetum humilis | |
| Special Agricultural Areas | Soils with the highest agricultural suitability | Category included in the deduced landscape proposal |
| Special Forest Areas | All tree formations existing within 500 meters of the high tide line / ecological protection tree curtain (existing or to be created) | The information provided by Ilídio de Araújo is incomplete and does not specify which areas should prioritise soil protection or soil regeneration. Therefore, we have identified the 500-meter buffer on the map where afforestation should be promoted and have also mapped the existing forested areas within it. |
| | Mandatory afforestation areas (soil protection or soil regeneration) | |
| Underground Reserve Areas | Underground Reserve Areas | Ilídio de Araújo does not identify these in the case studies, as the information he provided is incomplete and does not allow us to determine whether they would be included in his proposal. |



| Categories | Subcategories | Deduced Landscape Proposal for Vila do Conde, Póvoa de Varzim and Esposende |
|---|---|---|
| Degraded Areas to be Rehabilitated | Landscape integration of panoramic roads | Ilídio de Araújo does not identify these in the case studies, as the information he provided is incomplete and does not allow us to determine whether they would be included in his proposal. |
| | Landscape integration of monuments and scenic spots | |
| | Landscape integration of quarries, gravel pits, sandpits | |
| | Landscape integration of infrastructure lines (energy, telecommunication) and their stations | |
| | Demolitions (ecological and landscape sensitive areas) | |
| | Areas with high levels of pollution (industrial areas, landfills and dumps, polluted stretch of water stream) | |
| | Beach access points (roads and parking lots) | |
| | Channelised watercourses | |
| Urban intervention areas | Clusters 3km | Ilídio de Araújo only identifies the 1 km clusters in Póvoa de Varzim and Vila do Conde; therefore, we have only included this subcategory on the map. Information for Esposende is not available. |
| | Clusters 1km | |
| | Degraded areas to be restored through urban intervention | |

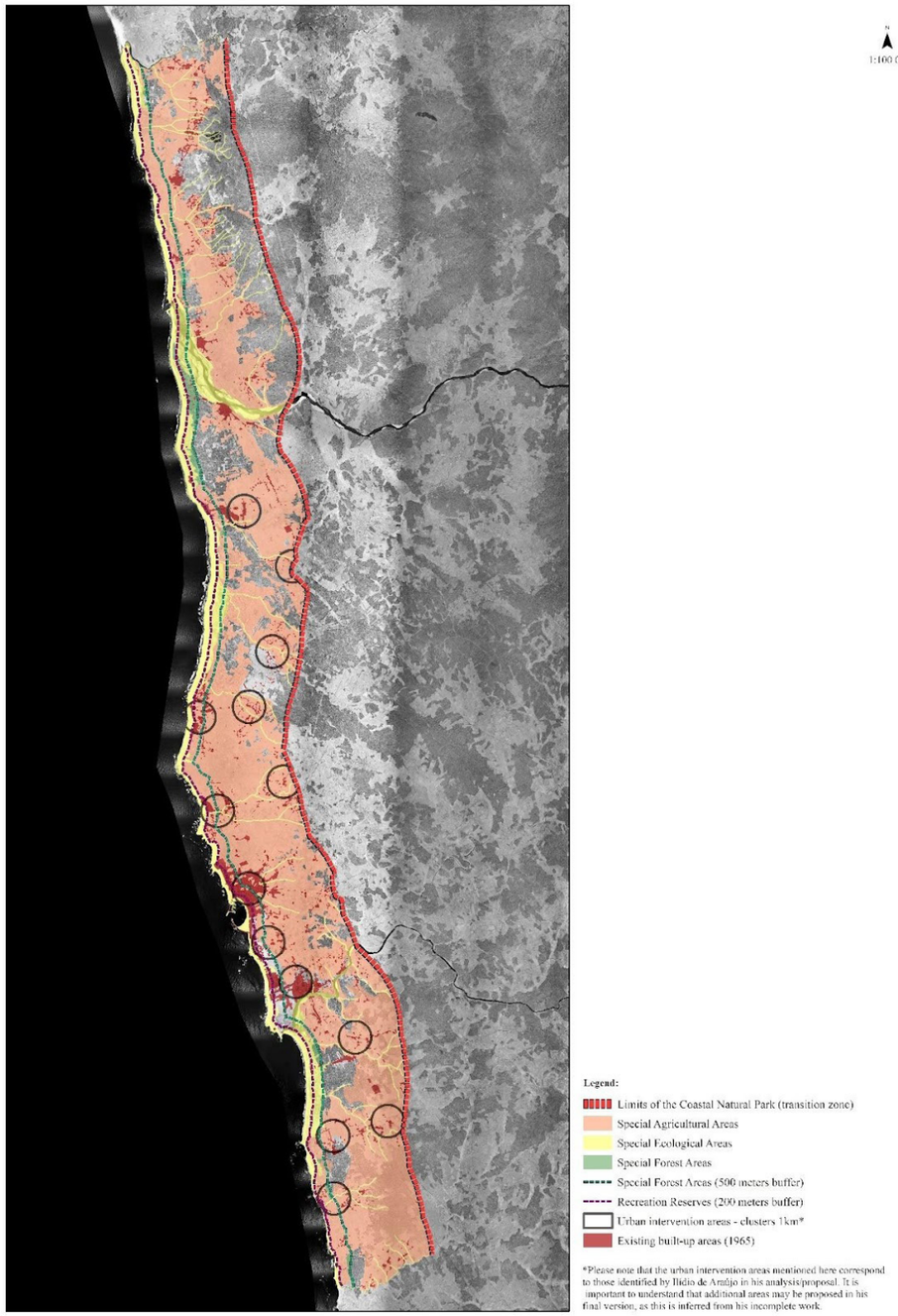



**Figure 15** Deduced Landscape Proposal Map for Vila do Conde, Póvoa de Varzim and Esposende based on Ilídio de Araújo vision



# APPENDIX 13 – LULC Mega classes and classes evolution in the case studies

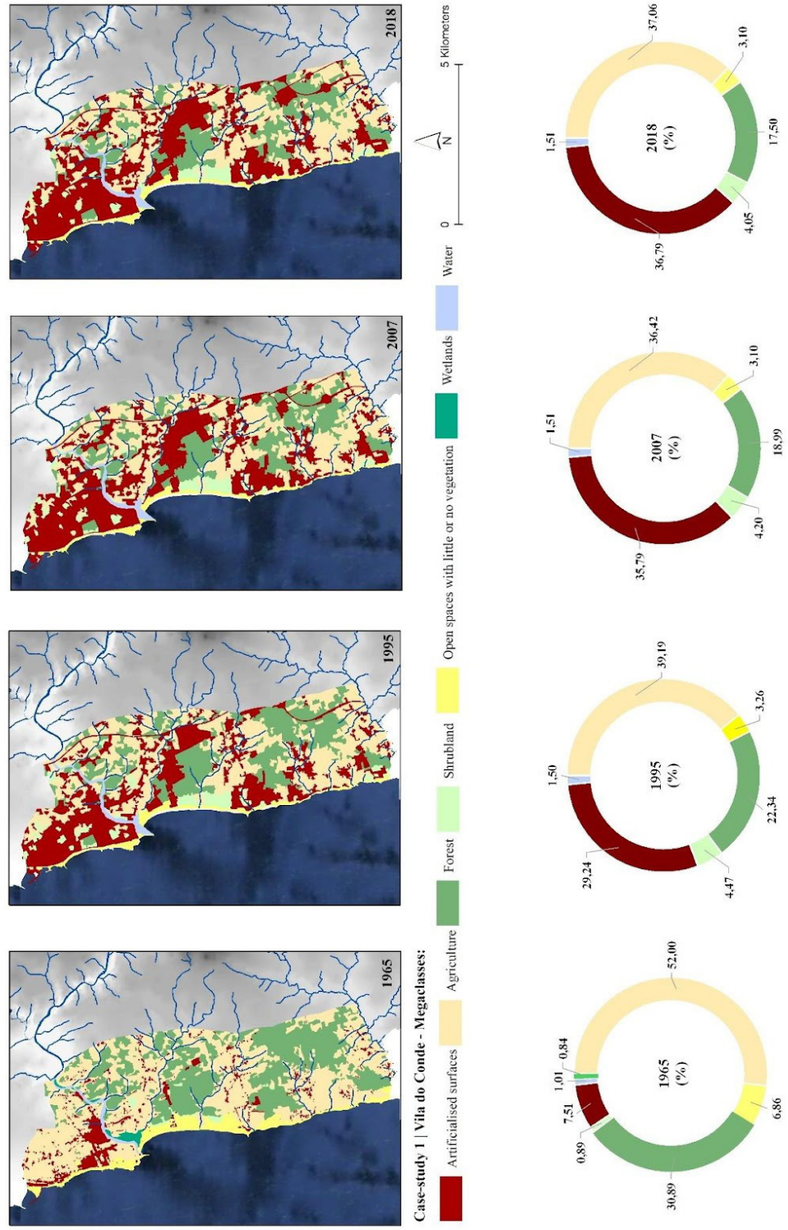



**Figure 16** Visual representation of the evolution of LULC mega classes for the years 1965, 1995, 2007, and 2018 in Vila do Conde

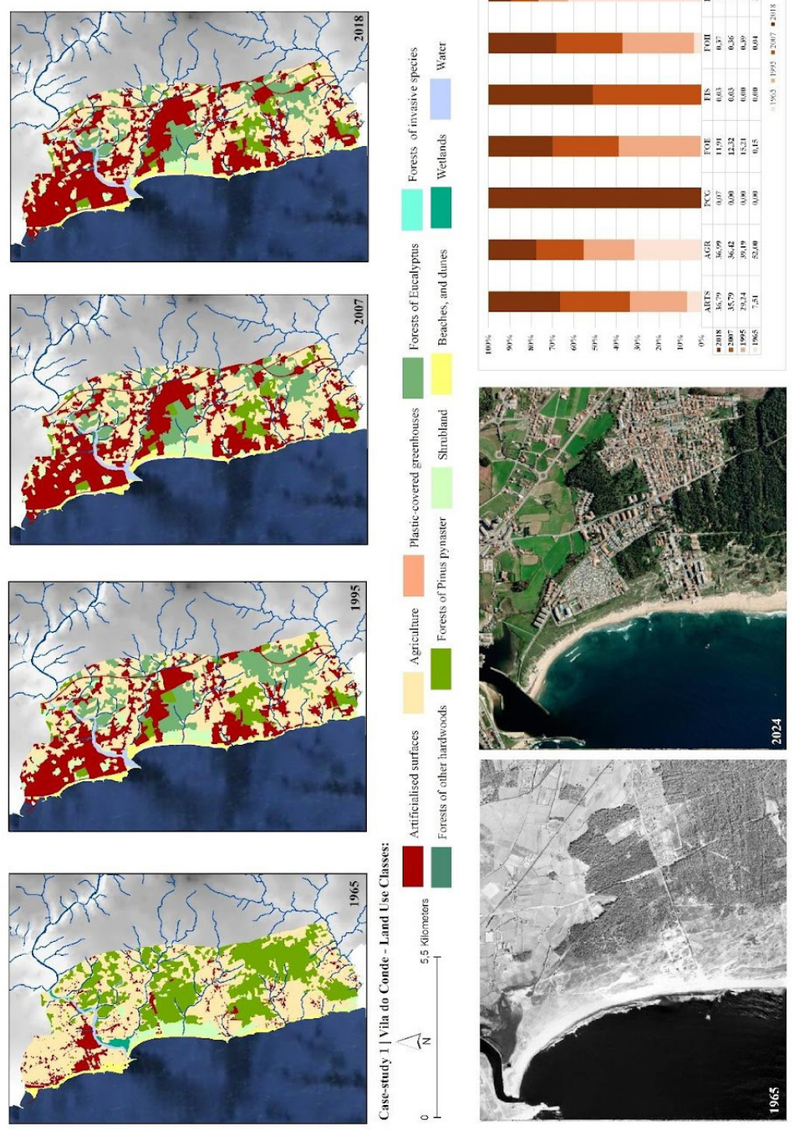



**Figure 17** Visual representation of the evolution of LULC classes for the years 1965, 1995, 2007, and 2018 in Vila do Conde

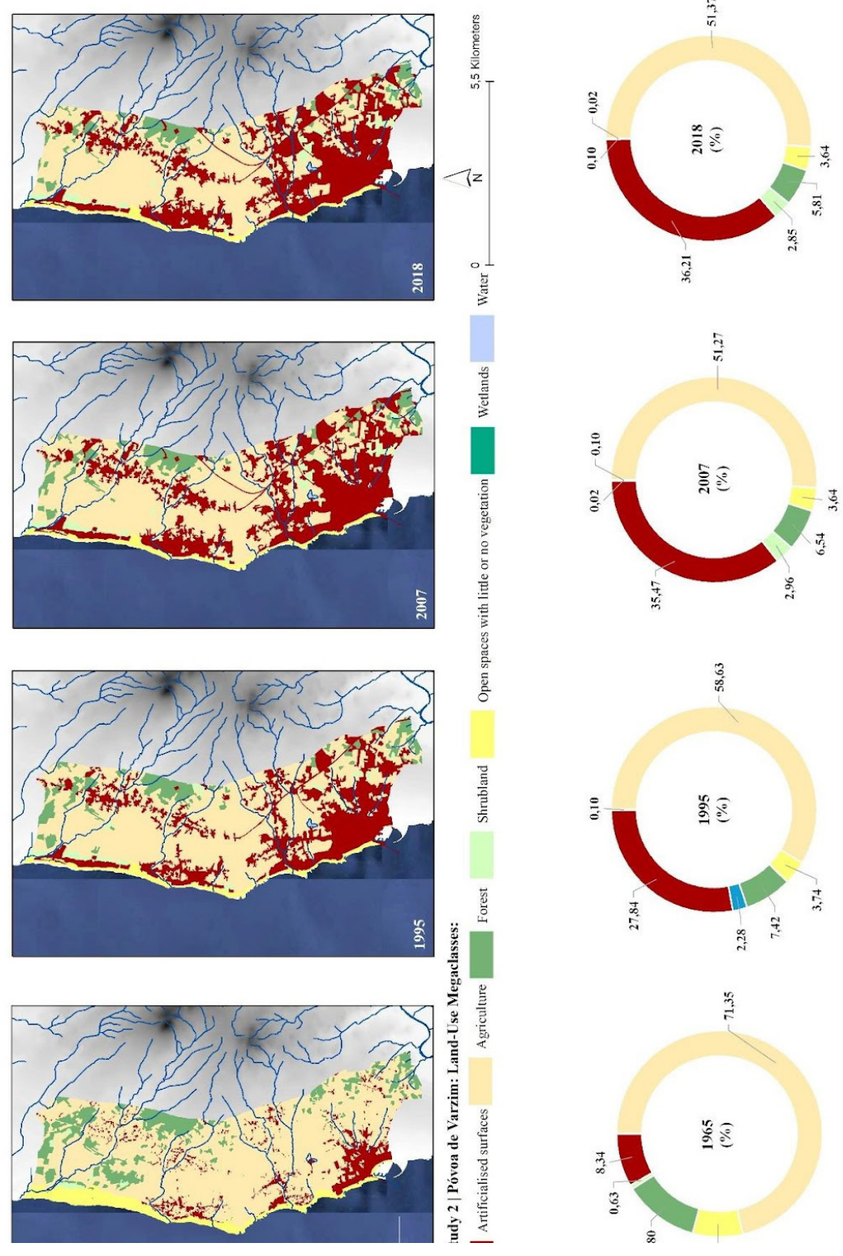
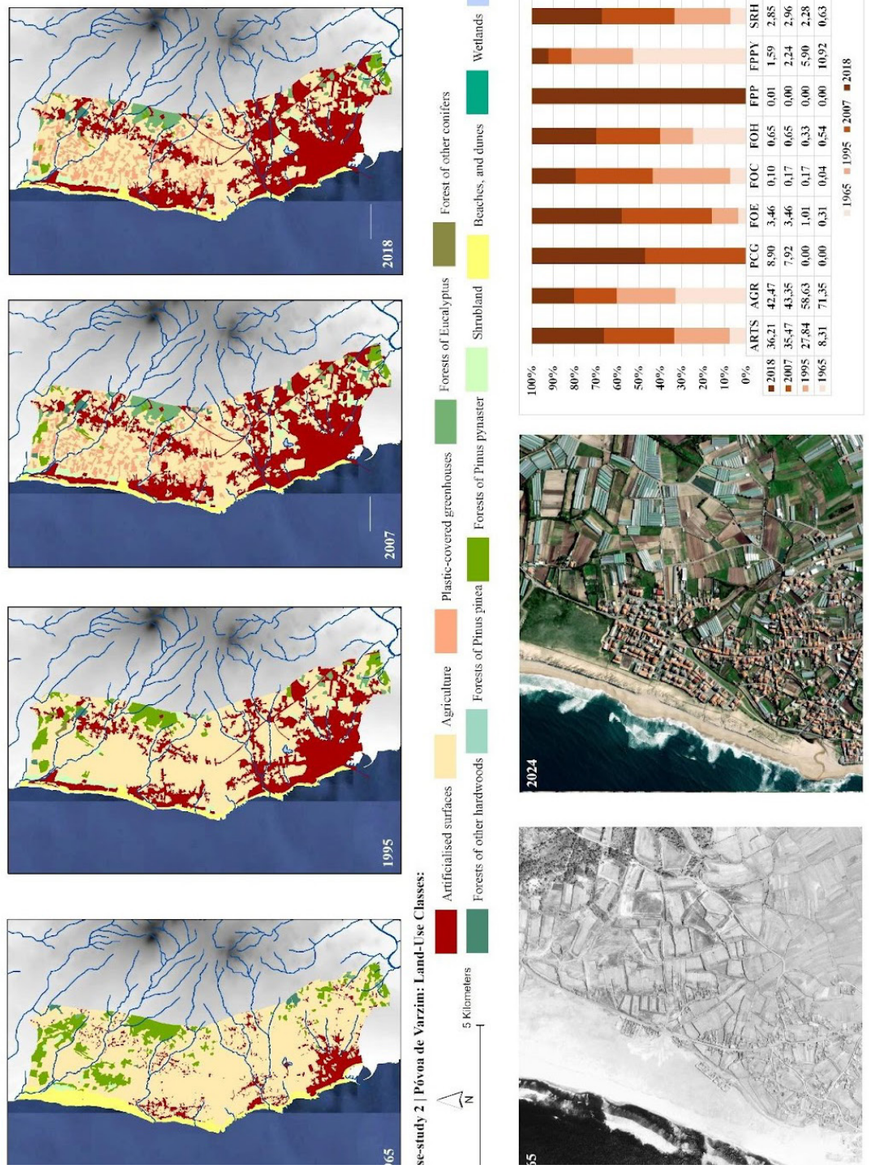



**Figure 18** Visual representation of the evolution of LULC mega classes for the years 1965, 1995, 2007, and 2018 in Póvoa de Varzim




| | ARTS | AGR | PCG | FOE | FOC | FOH | FPP | FPPY | SRH | BDU | WET | WAT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2018 | 36,21 | 42,47 | 8,90 | 3,46 | 0,10 | 0,65 | 0,01 | 1,59 | 2,85 | 3,64 | 0,02 | 0,10 |
| 2007 | 35,47 | 43,35 | 7,92 | 3,46 | 0,17 | 0,65 | 0,00 | 2,24 | 2,96 | 3,64 | 0,02 | 0,10 |
| 1995 | 27,84 | 58,63 | 0,00 | 1,01 | 0,17 | 0,33 | 0,00 | 5,90 | 2,28 | 3,74 | 0,00 | 0,10 |
| 1965 | 8,31 | 71,35 | 0,00 | 0,31 | 0,04 | 0,54 | 0,00 | 10,92 | 0,63 | 7,87 | 0,00 | 0,00 |

**Figure 19** Visual representation of the evolution of LULC classes for the years 1965, 1995, 2007, and 2018 in Póvoa de Varzim

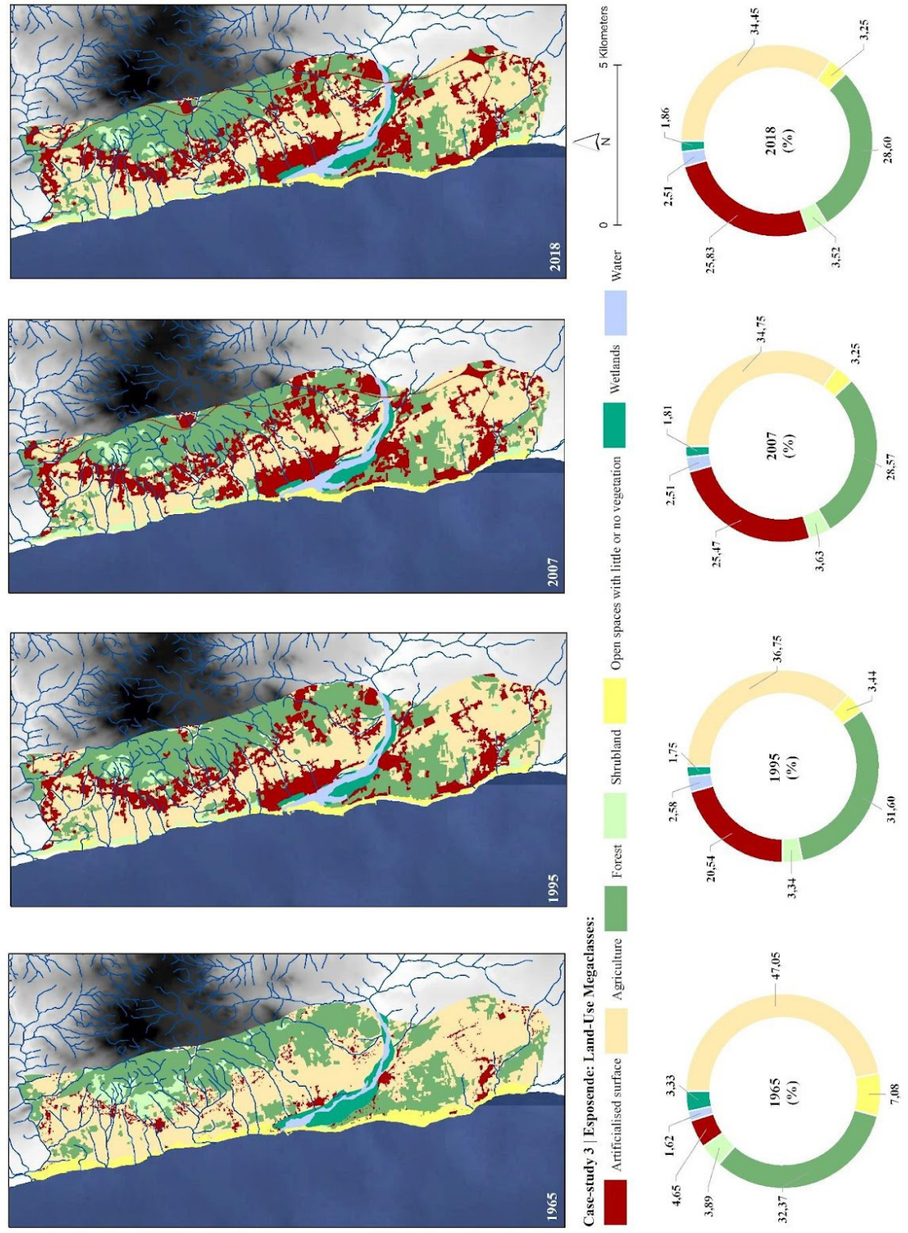



**Figure 20** Visual representation of the evolution of LULC mega classes for the years 1965, 1995, 2007, and 2018 in Esposende

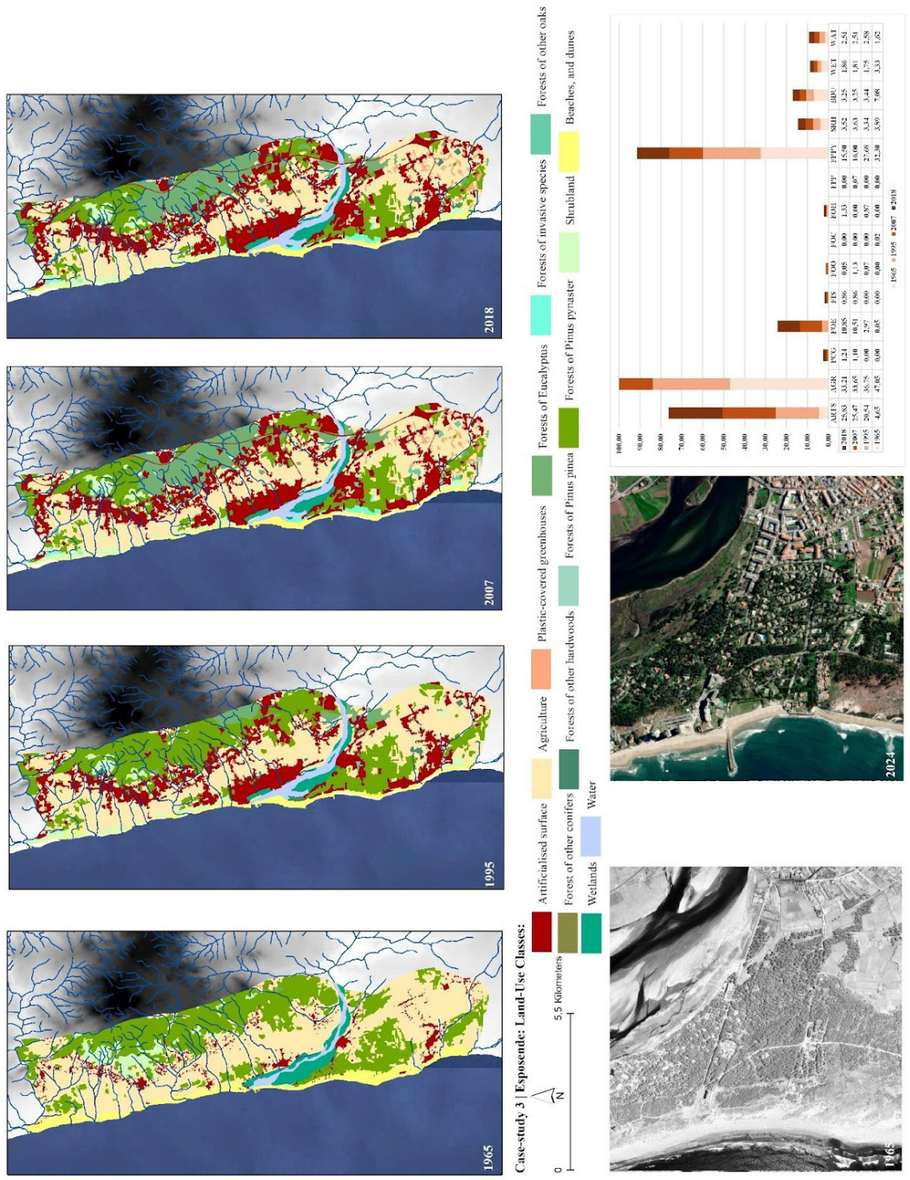



**Figure 21** Visual representation of the evolution of LULC classes for the years 1965, 1995, 2007, and 2018 in Esposende



# APPENDIX 14 – Protected Areas

### Historical Evolution of the Mindelo Ornithological Reserve's Protection Status

In 1957, after Santos Júnior's proposal, the Mindelo Ornithological Reserve was established in the municipality of Vila do Conde due to its ecological importance in protecting migratory birds (Velo-Antón, 2020). In 1959, their limits were extended to include the southern bank of the Ave River. However, in 1970, with the introduction of the first national legislation for nature protection (Decree-Law n.º 9/70), the Mindelo Ornithological Reserve lost its protected status. Since then, several attempts have been made to restore this protection. However, it was not until 2009 that the area regained its protection status with the establishment of the Regional Protected Landscape of the Vila do Conde Coast and the Mindelo Ornithological Reserve. A significant aspect of the 2009 classification studies (Honrado et al., 2005) was the argument that the area could also serve as a coastal agro park in the Metropolitan Area of Porto, aligning with the underlying idea of the POOC-CE 1999, which referred to this area as an Ornithological Park. Additionally, due to fifty years of delays in the classification of the area, the 2009 boundaries were constrained by urban development; however, the National Ecological Reserve played a significant role in safeguarding the areas classified as protected, while the remaining areas mainly were urbanised.

### Protected Coastal Landscape of Esposende

Regarding the Protected Coastal Landscape of Esposende, established in 1987, the primary objective was to safeguard the area from the threats that Ilídio de Araújo had identified nearly a decade earlier, yet no measures were implemented at that time, as stated in the Preamble of the Decree-Law 357/87: *"The northern coastal area has been subjected to various assaults, ranging from illegal subdivisions to chaotic 'urbanisation,' along with the uncontrolled extraction of dune areas and the sacrifice of ecosystems of rare importance. To address this situation, it was the initiative of the Municipal Assembly of Esposende to propose the classification of the entire coastline between Apúlia and the mouth of the Neiva River, covering a distance of 18 km, as a protected area. (...) The now-protected area, primarily consisting of a sandy beach strip and primary and secondary dunes (ranging in width from 50 m to 300 m), which are highly unstable and at risk of erosion, will be preserved to maintain its recreational function while safeguarding its environmental and landscape context, which is truly remarkable"*. Despite the intentions outlined in the POOC-CE 1999 to expand its boundaries to encompass the Cávado Estuary and extend the protected area to Aguçadoura in Póvoa de Varzim, thereby safeguarding the *masseiras* system, no actions have been taken to implement these proposals.

In 2005, the boundaries of the Protected Coastal Landscape of Esposende were reassessed, leading to the inclusion of a marine component and a readjustment of its terrestrial limits without exceeding the administrative boundaries of Esposende. This change followed the identification of the 'Litoral Norte' site within Portugal's Natura 2000 network and the concurrent development of the Management Plan for the Protected Landscape. A significant outcome of this reassessment was the reclassification of the Esposende Coastal Protected Landscape as the North Coast Natural Park (Regulatory Decree n.º 6/2005). According to Decree-Law n.º 19/93, which established the regulations concerning the National Network of Protected Areas at that time, a natural park is defined as *"an area characterised by containing natural, semi-natural, and humanised landscapes of national interest, serving as an example of the harmonious integration of human activity and Nature, and featuring samples of a biome or natural region"*. In contrast, a protected landscape refers to *"an area with natural, semi-natural, and humanised landscapes of regional or local interest, resulting from the harmonious interaction of humans and Nature, which exhibits significant aesthetic or natural value"*. The justification for reclassifying the area from a Protected Landscape to a Natural Park, as stated in Regulatory Decree n.º 6/2005, was driven by the need for enhanced protection of its ecological, geological, and aesthetic values, the presence of high biodiversity, and the necessity to address urban pressures while safeguarding its national and European significance.

In Esposende, the Protected Coastal Landscape established in 1987 marked the first significant effort to protect the coastal dune system, which later benefited from the delimitation of the National Ecological Reserve in 1996. However, the Ofir area was an exception, as it experienced most of the development until 1995. The construction of the Ofir Hotel in 1945 and, later in the 70's decade, the three apartment towers built on the primary dune contributed to urban development in an attractive yet highly fragile area (Figure 22). The Ofir region is one of the most critical areas in terms of erosion in the Northern Coastal Region, strongly influenced by urban development and the need to construct three breakwaters intended to safeguard the zone (Figure 23), among several other interventions that aim to protect the apartment towers.

**Figure 22** Two of the Ofir Apartment Towers. © Carla Gonçalves

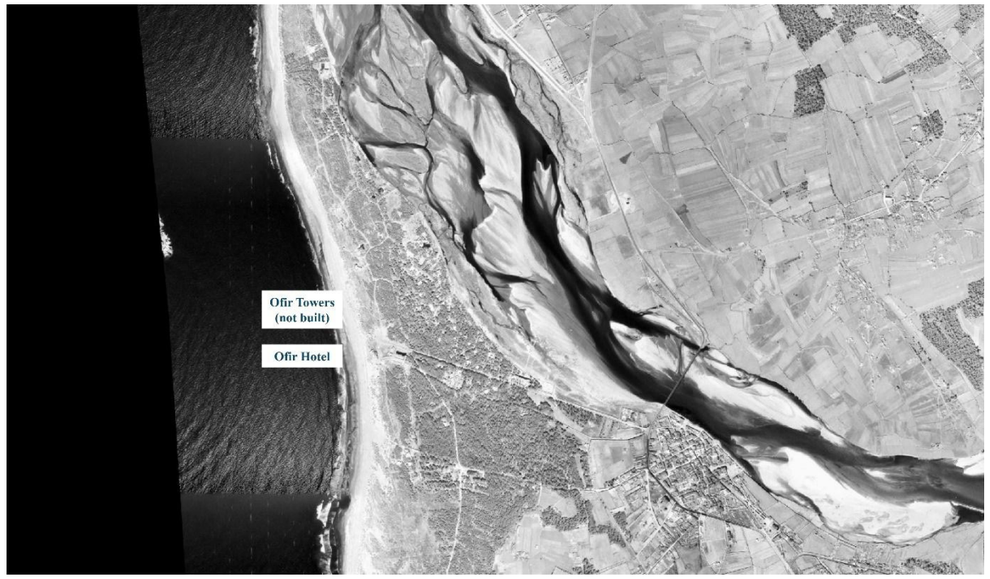


**Figure 23** Ofir in 1965 and 2023

# APPENDIX 15 – LULC classes transitions (%)

**Table 16** LULC classes transitions in Vila do Conde (units: %)

| Periods | Classes | Classes | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ARTS | AGR | PCG | FOE | FIS | FOC | FOH | FPP | FPPY | SRH | BDU | WET | WAT |
| 1965-2018 | ARTS | 6,63 | 0,16 | -- | 0,01 | -- | -- | 0,04 | -- | 0,34 | 0,26 | 0,03 | -- | -- |
| | AGR | 18,81 | 29,86 | 0,07 | 0,68 | 0,03 | -- | 0,18 | -- | 0,19 | 1,60 | 0,04 | -- | 0,04 |
| | PCG | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | 0,01 | 0,01 | -- | 0,12 | -- | -- | 0,04 | -- | -- | -- | -- | -- | -- |
| | FIS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPPY | 8,92 | 5,95 | -- | 10,79 | -- | -- | 0,06 | -- | 4,49 | 0,35 | -- | -- | -- |
| | SRH | 1,13 | 0,47 | -- | 0,16 | -- | -- | -- | -- | 0,13 | 1,64 | 1,09 | -- | 0,02 |
| | BDU | 0,80 | 0,02 | -- | | -- | -- | -- | -- | -- | 0,05 | 1,76 | -- | 0,77 |
| | WET | 0,20 | 0,16 | -- | 0,03 | -- | -- | -- | -- | -- | 0,10 | 0,01 | -- | 0,34 |
| | WAT | 0,17 | 0,02 | -- | 0,01 | -- | -- | 0,04 | -- | -- | 0,15 | -- | -- | 1,04 |
| 1965-1995 | ARTS | 6,64 | 0,24 | -- | 0,01 | -- | -- | 0,04 | -- | 0,30 | 0,21 | 0,03 | -- | -- |
| | AGR | 14,75 | 33,58 | -- | 0,79 | -- | -- | 0,15 | -- | 0,31 | 1,85 | 0,04 | -- | 0,04 |
| | PCG | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | -- | 0,01 | -- | 0,13 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FIS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOH | -- | -- | -- | -- | -- | -- | 0,04 | -- | -- | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPPY | 5,71 | 4,59 | -- | 13,93 | -- | -- | 0,12 | -- | 5,87 | 0,36 | -- | -- | -- |
| | SRH | 1,01 | 0,26 | -- | 0,18 | -- | -- | -- | -- | 0,17 | 1,80 | 1,18 | -- | 0,02 |
| | BDU | 0,77 | 0,03 | -- | -- | -- | -- | -- | -- | -- | 0,04 | 1,77 | -- | 0,77 |
| | WET | 0,18 | 0,09 | -- | 0,02 | -- | -- | -- | -- | 0,01 | 0,16 | 0,06 | -- | 0,32 |
| | WAT | 0,09 | 0,02 | -- | 0,01 | -- | -- | 0,04 | -- | 0,01 | 0,01 | 0,14 | -- | 1,06 |

| Periods | Classes | Classes | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ARTS | AGR | PCG | FOE | FIS | FOC | FOH | FPP | FPPY | SRH | BDU | WET | WAT |
| 1995-2007 | ARTS | 29,10 | 0,03 | -- | -- | -- | -- | -- | -- | -- | 0,08 | -- | -- | -- |
| | AGR | 3,48 | 34,61 | -- | 0,13 | 0,03 | -- | 0,06 | -- | 0,01 | 0,84 | -- | -- | -- |
| | PCG | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | 1,29 | 0,76 | -- | 12,05 | -- | -- | -- | -- | 0,76 | 0,33 | -- | -- | -- |
| | FIS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOH | 0,02 | 0,10 | -- | 0,03 | -- | -- | 0,24 | -- | -- | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPPY | 0,77 | 0,31 | -- | 0,12 | -- | -- | 0,02 | -- | 5,44 | 0,07 | -- | -- | -- |
| | SRH | 0,97 | 0,54 | -- | -- | -- | -- | 0,04 | -- | 0,06 | 2,85 | -- | -- | -- |
| | BDU | 0,06 | 0,06 | -- | -- | -- | -- | -- | -- | -- | 0,02 | 3,10 | -- | 0,02 |
| | WET | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | WAT | 0,08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1,48 |
| 2007-2018 | ARTS | 35,54 | 0,09 | -- | -- | -- | -- | 0,02 | -- | -- | 0,14 | -- | -- | -- |
| | AGR | 0,18 | 35,75 | 0,07 | 0,14 | -- | -- | -- | -- | 0,01 | 0,27 | -- | -- | -- |
| | PCG | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | 0,45 | 0,71 | -- | 11,16 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FIS | -- | -- | -- | -- | 0,03 | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOH | 0,01 | 0,01 | -- | -- | -- | -- | 0,35 | -- | -- | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPPY | 0,07 | 0,41 | -- | 0,61 | -- | -- | -- | -- | 5,19 | -- | -- | -- | -- |
| | SRH | 0,54 | 0,02 | -- | -- | -- | -- | -- | -- | -- | 3,64 | -- | -- | -- |
| | BDU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3,10 | -- | -- |
| | WET | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | WAT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1,51 |



**Table 17** LULC classes transitions in Póvoa de Varzim (units: %)

| Periods | Classes | Classes | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ARTS | AGR | PCG | FOE | FIS | FOC | FOH | FPP | FPPY | SRH | BDU | WET | WAT |
| 1965-2018 | ARTS | 8,8 | 0,16 | 0,05 | -- | -- | -- | -- | -- | -- | 0,02 | 0,03 | -- | 0,03 |
| | AGR | 23,72 | 38,33 | 7,15 | 0,40 | -- | -- | 0,05 | -- | 0,20 | 1,74 | 0,01 | -- | 0,07 |
| | PCG | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | 0,10 | 0,01 | -- | 0,04 | -- | -- | -- | -- | 0,11 | -- | -- | -- | -- |
| | FIS | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -- | -- | -- |
| | FOC | -- | -- | 0,02 | -- | -- | -- | -- | -- | 0,01 | -- | -- | -- | -- |
| | FOH | 0,24 | 0,10 | 0,04 | 0,08 | -- | -- | -- | -- | 0,08 | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPPY | 1,38 | 3,30 | 1,30 | 2,95 | | 0,09 | 0,60 | | 1,19 | 0,13 | -- | -- | -- |
| | SRH | 0,07 | 0,23 | 0,23 | -- | -- | -- | -- | -- | -- | 0,11 | -- | -- | -- |
| | BDU | 2,40 | 0,35 | 0,10 | -- | -- | -- | -- | -- | -- | 0,84 | 3,59 | 0,02 | -- |
| | WET | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | WAT | 0,21 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0,01 | -- | -- |
| 1965-1995 | ARTS | 7,81 | 0,41 | -- | -- | -- | -- | -- | -- | -- | 0,01 | 0,03 | -- | 0,03 |
| | AGR | 16,05 | 53,49 | -- | 0,19 | -- | 0,01 | 0,01 | -- | 0,49 | 0,85 | 0,02 | -- | 0,07 |
| | PCG | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | 0,12 | 0,02 | -- | 0,03 | -- | | | -- | 0,13 | -- | -- | -- | -- |
| | FIS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOC | -- | -- | -- | -- | -- | -- | -- | -- | 0,03 | -- | -- | -- | -- |
| | FOH | 0,24 | 0,07 | -- | -- | -- | -- | -- | -- | 0,22 | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPPY | 0,88 | 3,60 | -- | 0,79 | -- | 0,15 | 0,32 | -- | 4,86 | 0,30 | -- | -- | -- |
| | SRH | 0,06 | 0,40 | -- | -- | -- | 0,01 | -- | -- | 0,08 | 0,08 | -- | -- | -- |
| | BDU | 2,28 | 0,25 | -- | -- | -- | -- | -- | -- | 0,04 | 1,03 | 3,65 | -- | 0,63 |
| | WET | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | WAT | 0,21 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0,01 | -- | -- |
| 1995-2007 | ARTS | 27,80 | -- | -- | -- | -- | -- | -- | -- | -- | 0,03 | -- | -- | 0,10 |
| | AGR | 7,00 | 42,23 | 7,77 | 0,09 | -- | -- | -- | -- | 0,11 | 1,42 | -- | -- | -- |
| | PCG | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | 0,09 | 0,07 | 0,01 | 0,71 | -- | -- | 0,08 | -- | 0,01 | 0,03 | -- | -- | -- |
| | FIS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOC | -- | -- | -- | -- | -- | 0,17 | | -- | -- | -- | -- | -- | -- |
| | FOH | 0,01 | -- | -- | -- | -- | -- | 0,32 | -- | -- | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | | -- | -- | -- | -- | -- | -- |
| | FPPY | 0,22 | 0,57 | 0,11 | 2,58 | -- | -- | 0,25 | -- | 2,13 | 0,04 | -- | -- | -- |
| | SRH | 0,25 | 0,47 | 0,03 | 0,08 | -- | -- | | -- | -- | 1,43 | -- | 0,02 | -- |
| | BDU | 0,10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3,64 | -- | -- |
| | WET | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | WAT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | | | | | | | | | | | | |

| Periods | Classes | Classes | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ARTS | AGR | PCG | FOE | FIS | FOC | FOH | FPP | FPPY | SRH | BDU | WET | WAT |
| 2007-2018 | ARTS | 35,29 | 0,04 | -- | -- | -- | -- | -- | -- | -- | 0,02 | -- | -- | -- |
| | AGR | 0,81 | 41,74 | 0,86 | -- | -- | -- | -- | -- | -- | 0,01 | -- | -- | -- |
| | PCG | -- | 0,09 | 7,85 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | 0,02 | 0,01 | 0,01 | 3,43 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FIS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOC | -- | 0,07 | -- | -- | -- | 0,10 | -- | -- | -- | -- | -- | -- | -- |
| | FOH | -- | 0,02 | -- | -- | -- | -- | 0,64 | -- | -- | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPPY | 0,06 | 0,37 | 0,18 | 0,04 | -- | -- | 0,02 | -- | 1,59 | -- | -- | -- | -- |
| | SRH | 0,03 | 0,12 | -- | -- | -- | -- | -- | -- | | 2,82 | -- | -- | -- |
| | BDU | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3,64 | -- | -- |
| | WET | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0,02 | -- |
| | WAT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0,10 |



**Table 18** LULC classes transitions in Esposende (unit: %)

| Periods | Classes | Classes | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ARTS | AGR | PCG | FOE | FIS | FOC | FOH | FPP | FPPY | SRH | BDU | WET | WAT |
| **1965-2018** | ARTS | 4,34 | 0,14 | 0,02 | 0,01 | 0,02 | -- | 0,01 | -- | 0,07 | -- | 0,02 | -- | -- |
| | AGR | 12,67 | 29,69 | 1,09 | 0,59 | 0,06 | -- | 0,74 | -- | 1,32 | 0,67 | 0,01 | 0,04 | 0,01 |
| | PCG | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | 0,01 | -- | -- | -- | -- | -- | -- | -- | 0,04 | -- | -- | -- | -- |
| | FIS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOC | -- | -- | -- | -- | -- | -- | -- | -- | 0,02 | -- | -- | -- | -- |
| | FOH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPPY | 6,86 | 2,67 | 0,12 | 9,34 | 0,18 | -- | 0,32 | -- | 12,28 | 0,41 | -- | -- | -- |
| | SRH | 0,59 | 0,19 | -- | 0,81 | 0,03 | -- | 0,25 | -- | 1,22 | 0,76 | 0,03 | -- | -- |
| | BDU | 0,79 | 0,21 | -- | -- | 0,57 | -- | -- | -- | 0,40 | 1,57 | 2,67 | 0,02 | 0,83 |
| | WET | 0,31 | 0,02 | -- | -- | -- | -- | 0,02 | -- | 0,03 | 0,08 | 0,08 | 1,66 | 1,12 |
| | WAT | 0,04 | 0,02 | -- | -- | -- | -- | 0,04 | -- | -- | -- | 0,40 | 0,12 | 1,33 |
| **1965-1995** | ARTS | 4,27 | 0,22 | -- | -- | -- | -- | 0,02 | -- | 0,10 | 0,01 | 0,01 | -- | -- |
| | AGR | 10,46 | 33,31 | -- | 0,23 | -- | -- | 0,33 | -- | 1,99 | 0,50 | 0,01 | 0,04 | 0,01 |
| | PCG | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | 0,01 | -- | -- | -- | -- | -- | -- | -- | 0,05 | -- | -- | -- | -- |
| | FIS | -- | -- | -- | -- | -- | -- | -- | -- | | -- | -- | -- | -- |
| | FOC | -- | -- | -- | -- | -- | -- | -- | -- | 0,02 | -- | -- | -- | -- |
| | FOH | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPPY | 4,00 | 2,44 | -- | 2,52 | -- | -- | 0,26 | -- | 22,66 | 0,30 | -- | -- | -- |
| | SRH | 0,56 | 0,22 | -- | 0,19 | -- | -- | 0,23 | -- | 1,90 | 0,74 | 0,03 | -- | -- |
| | BDU | 0,79 | 0,23 | -- | -- | -- | -- | 0,04 | -- | 0,72 | 1,65 | 2,83 | -- | 0,80 |
| | WET | 0,28 | 0,02 | -- | -- | -- | -- | -- | -- | 0,03 | 0,11 | 0,10 | 1,61 | 1,17 |
| | WAT | 0,03 | 0,02 | -- | -- | -- | -- | 0,04 | -- | -- | 0,01 | 0,42 | 0,09 | 1,34 |
| **1995-2007** | ARTS | 20,51 | 0,03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | AGR | 2,24 | 32,76 | 1,06 | 0,14 | 0,02 | -- | 0,13 | -- | 0,13 | 0,26 | 0,01 | -- | -- |
| | PCG | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | 0,19 | -- | -- | 2,78 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FIS | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOH | 0,07 | -- | -- | -- | 0,17 | -- | 0,70 | -- | -- | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | | -- | -- | -- | -- | -- | -- |
| | FPPY | 2,36 | 0,81 | 0,04 | 7,59 | 0,56 | -- | 0,16 | 0,07 | 15,78 | 0,34 | -- | -- | -- |
| | SRH | 0,07 | 0,05 | -- | -- | 0,08 | -- | 0,14 | -- | 0,08 | 2,88 | 0,02 | 0,02 | -- |
| | BDU | -- | -- | -- | -- | 0,03 | -- | -- | -- | 0,01 | 0,15 | 3,23 | 0,01 | -- |
| | WET | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | | 1,75 | -- |
| | WAT | 0,03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0,03 | 2,51 |

| Periods | Classes | Classes | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ARTS | AGR | PCG | FOE | FIS | FOC | FOH | FPP | FPPY | SRH | BDU | WET | WAT |
| 2007-2018 | ARTS | 25,23 | 0,20 | -- | 0,06 | -- | -- | -- | -- | 0,23 | 0,09 | -- | -- | -- |
| | AGR | 0,06 | 32,94 | 0,03 | 0,02 | -- | -- | -- | -- | 0,08 | 0,06 | -- | -- | -- |
| | PCG | -- | 0,17 | 1,07 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOE | 0,10 | -- | -- | 10,42 | -- | -- | -- | -- | 0,28 | 0,05 | -- | -- | -- |
| | FIS | -- | -- | -- | -- | 0,86 | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FOH | 0,05 | 0,21 | -- | -- | -- | -- | 1,13 | -- | -- | -- | -- | -- | -- |
| | FPP | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FPPY | -- | 0,01 | -- | -- | -- | -- | -- | 0,07 | 15,41 | 0,01 | -- | -- | -- |
| | SRH | 0,02 | 0,12 | -- | 0,02 | -- | -- | -- | -- | -- | 3,35 | -- | -- | -- |
| | BDU | 0,01 | -- | -- | -- | -- | -- | -- | -- | -- | 0,06 | 3,18 | -- | -- |
| | WET | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0,04 | 1,81 | -- |
| | WAT | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0,03 | -- | 2,51 |



# APPENDIX 16 – LULC Class Transitions (graphical representation)

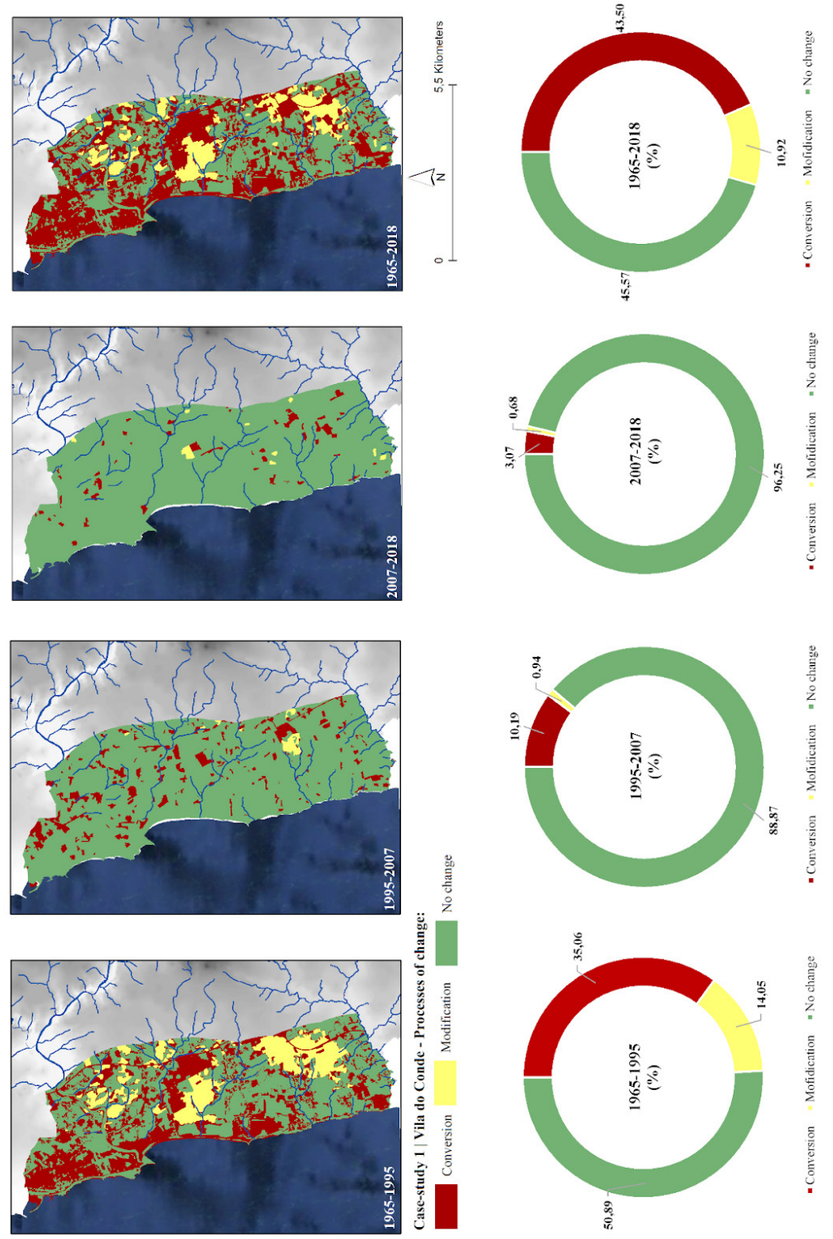



**Figure 24** LULC Class Transitions in Vila do Conde (1965-1995, 1995-2007, 2007-2018, and 1965-2018)

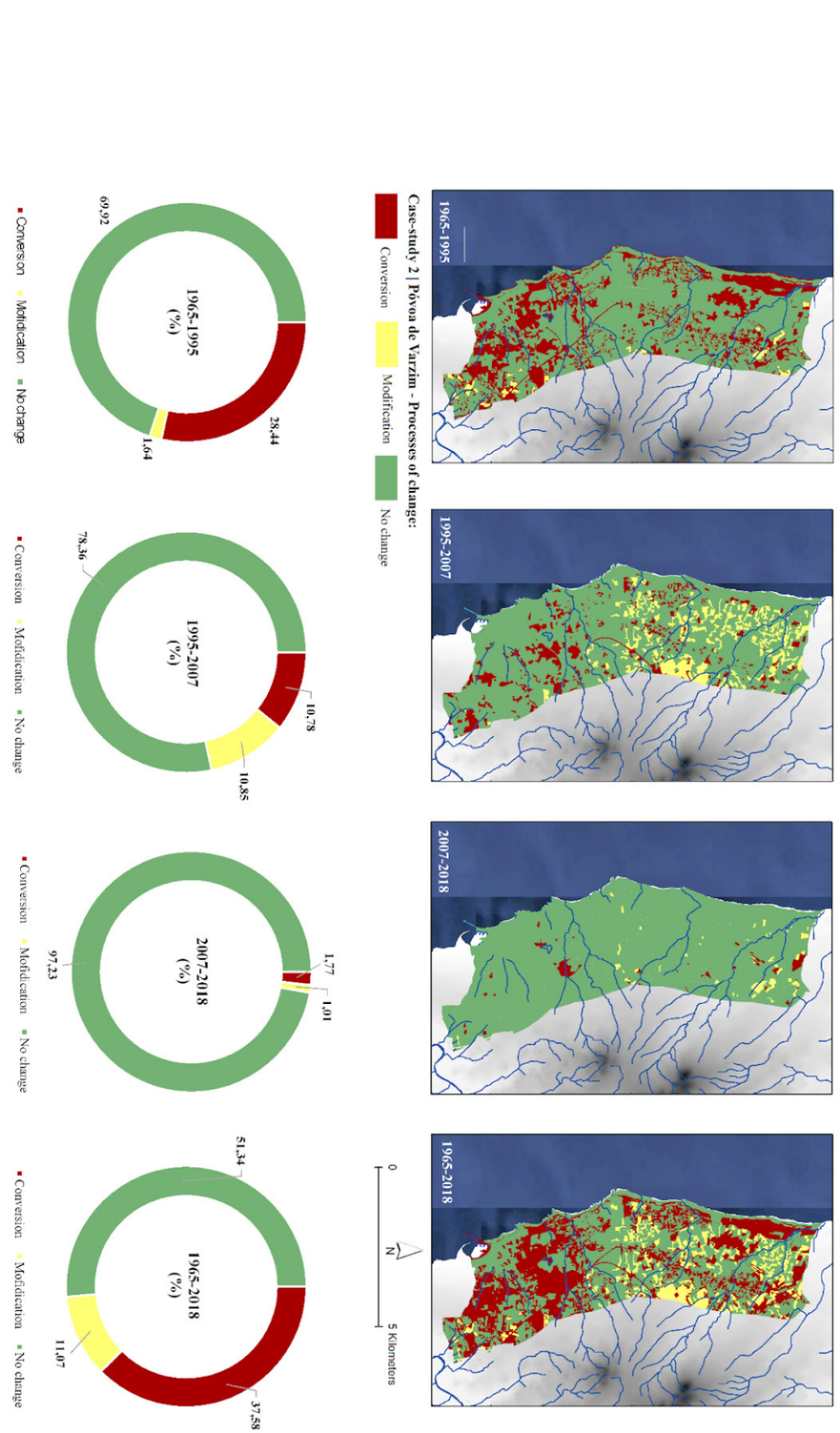



**Figure 25** LULC Class Transitions in Póvoa de Varzim (1965-1995, 1995-2007, 2007-2018, and 1965-2018)

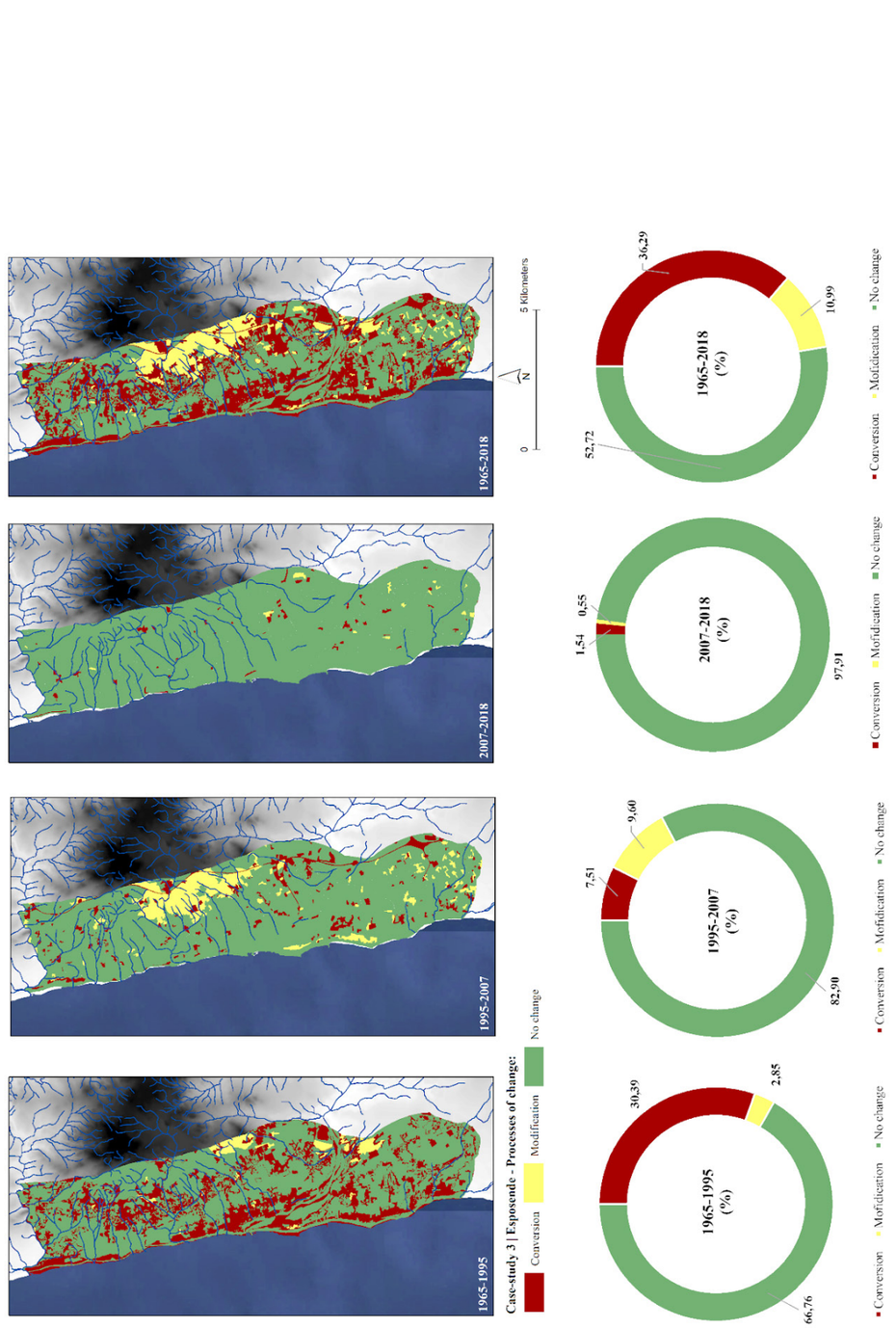



**Figure 26** LULC Class Transitions in Esposende (1965-1995, 1995-2007, 2007-2018, and 1965-2018)

# APPENDIX 17 – From the Special Agricultural and Ecological Reserves to the National Agricultural and Ecological Reserves

In our case studies, the National Agricultural Reserve was only enforced in 1991, thirteen years after Ilídio de Araújo's proposal, while the more restrictive National Ecological Reserve was enforced in three different moments: 1996 in Esposende, 1998 in Vila do Conde), and in 2000 in Póvoa de Varzim (Table 19).

**Table 19** Legal framework evolution of the National Agricultural and Ecological Reserves in Vila do Conde, Póvoa de Varzim and Esposende

| | | Vila do Conde | Póvoa de Varzim | Esposende |
|---|---|---|---|---|
| **National Agricultural Reserve** | **1st generation** | Ordinance n.º 435-C/91 | Ordinance n.º 435-L/91 | Ordinance n.º 435-M/91 |
| | **2nd generation** | n.a. | Notice n.º 2157/2015 | Notice n.º 10643/2015 |
| **National Ecological Reserve** | **1st generation** | Resolution of the Council of Ministers n.º 149/98 | Resolution of the Council of Ministers n.º 63/2000 | Resolution of the Council of Ministers n.º 141/96 |
| | **2nd generation** | n.a. | Ordinance n.º 330/2015 | Ordinance n.º 331/2015 |
| **Municipal Diretor Plan** | **1st generation** | Resolution of the Council of Ministers n.º 166/95 | Resolution of the Council of Ministers n.º 91/95 | Resolution of the Council of Ministers n.º 31/94 |
| | **2nd generation** | n.a. | Notice n.º 2157/2015 | Notice n.º 10643/2015 |

Consequently, urban development occurred in these areas prior to their first approvals, as the Municipal Director Plans were also only approved later in 1994 (Esposende) and 1995 (Vila do Conde and Póvoa de Varzim). After the approval of the POOC-CE 1999, the Municipal Director Plans had to conform their strategies and the regulations of land use, occupation, and transformation with the POOC-CE.

In Vila do Conde, the National Agricultural and Ecological Reserves remain in force because the Municipal Director Plan has not yet been reviewed since 1995, despite the legal requirement for a review every ten years following its approval. In contrast, Póvoa de Varzim and Esposende have already reviewed their plans (both in 2015), leading to small adjustments in both reserves within their municipalities (Figure 27 and Figure 28).

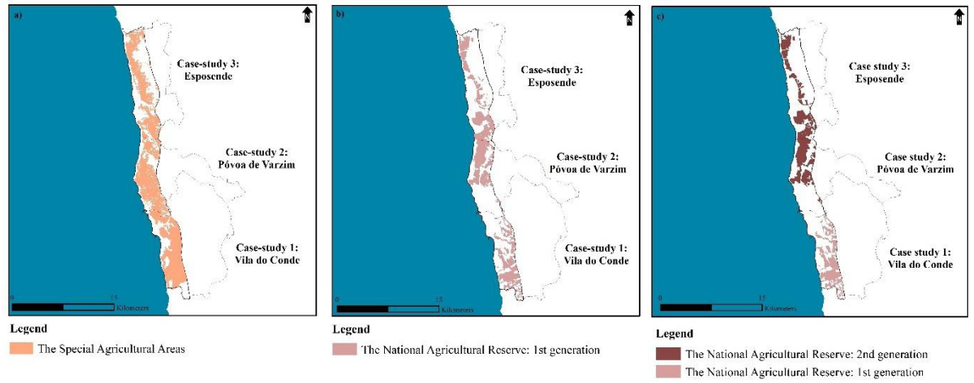



**Figure 27** From the Special Agricultural Areas to the National Agricultural Reserve (1st and 2nd generation)

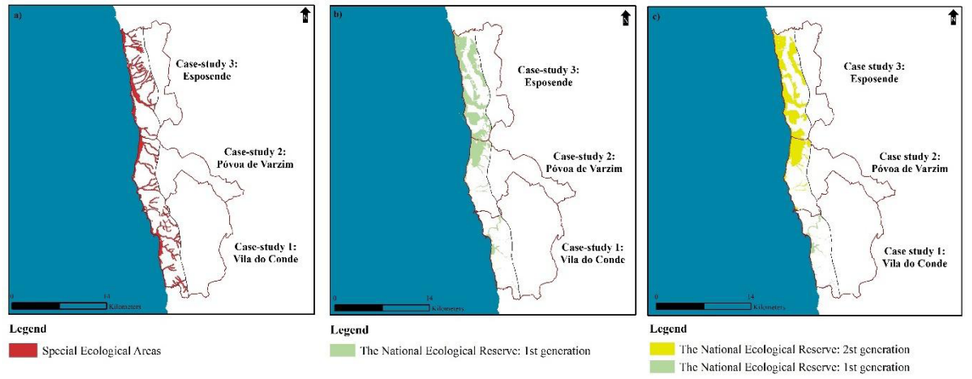



**Figure 28** From the Special Ecological Areas to the National Ecological Reserve (1st and 2nd generation)

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# Part B
# Published Articles

## Appendix 18 – Gonçalves, C., & Pinho, P. (2022). In search of coastal landscape governance: a review of its conceptualisation, operationalisation and research needs. Sustainability science, 17(5), 2093-2111. doi: https://doi.org/10.1007/s11625-022-01147-6

Sustainability Science (2022) 17:2093–2111
https://doi.org/10.1007/s11625-022-01147-6

REVIEW ARTICLE

# In search of coastal landscape governance: a review of its conceptualisation, operationalisation and research needs

Carla Gonçalves[1] · Paulo Pinho[1]

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**Abstract**
Coastal landscapes are spaces and places of conflict, being among the most dynamic and vulnerable environments on the planet. Coastal landscapes are regulated through various policy instruments focused on competing interests and land uses at several intersecting administrative scales. High levels of landscape transformation, partially induced by climate change, can also be observed in several coastal countries. This article presents a systematic literature review, using the PRISMA 2020 protocol, focusing on two central and complementary debates: one focuses exclusively on coastal landscape governance (landscape research) and the other on coastal governance (coastal planning research). The systematic conceptualisation of landscape governance has emerged in the last decade, particularly in western countries. Yet, the debate to date mainly focuses on forest landscape restoration in the Global South. There has not been a comprehensive debate focused on the procedural and substantive aspects of coastal landscapes governance. Coastal governance is an emergent challenge that needs to evolve to overcome an often overstretched and fragmented governance system which has to take into account current societal challenges. Building on 174 peer-reviewed English-language articles, results reveal research trends in the conceptualisation and operationalisation of both types of governance. The review shows that there is a growing awareness of the relevance of coastal governance and landscape governance. However, evidence confirms that a robust conceptualisation and operationalisation of coastal landscape governance is missing. Conclusions point to new directions for coastal landscape governance, highlighting the need to strengthen theoretical and empirical research.

**Keywords** Socio-ecological systems · Landscape approach · Integrated Coastal Zone Management · Landscape sustainability · Evolutionary Governance Theory · Adaptive governance

## Introduction

Coastal landscapes are spaces and places of conflict, being among the most dynamic and vulnerable environments on the planet. Coastal landscapes are regulated through various policy instruments that focus on competitive land uses and interests at several intersecting administrative scales (Rangel-Buitrago et al. 2018). High levels of coastal landscape transformation can also be observed (Romano and Zullo 2014), mainly because protecting landscapes of exceptional beauty has only been required in few coastal countries. A recent survey of the state of coastal regions worldwide demonstrated that anthropogenic pressures are severe and extensive and that "intact coastal regions are now rare" (Williams et al. 2022, p. 6). These findings corroborate a profound loss of biodiversity and landscape services and values with unprecedented environmental, economic, and social challenges ahead.

The overlapping of the different driving forces affecting coastal landscapes, and sectoral policies, instruments, and scales have substantially increased the complexity of governance (Kristensen and Primdahl 2020). Furthermore, governance challenges are expected to increase considerably in coastal countries with high infrastructure and population concentrations due to human-induced climate

Handled by Nick Harvey, University of Adelaide, Australia.

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ance as a new governance prism capable of connecting contemporary global challenges with a place-based, multi-level and multi-stakeholder integrated approach.

ber 2021 using SCOPUS. The literature search started using the keywords "coastal landscape governance", "coastal governance", and "landscape governance", but no entries were

concept has been studied or applied. A total of 174 articles (see appendix 1) fulfilled one of the criteria mentioned above (71.9% of screened articles) and were eligible for

entific backgrounds.





## Appendix 19 – Gonçalves, C., & Pinho, P. (2024). Does landscape play a role in the governance of the coastal region? An evolutionary perspective from Portugal since 1950. Progress in Planning, 181, 100811. doi: https://doi.org/10.1016/j.progress.2023.100811

Progress in Planning 181 (2024) 100811

Contents lists available at ScienceDirect

Progress in Planning

journal homepage: www.elsevier.com/locate/progress

# Does landscape play a role in the governance of the coastal region? An evolutionary perspective from Portugal since 1950

Carla Gonçalves *[,1], Paulo Pinho [2]

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Landscape approaches

ABSTRACT

The landscape crisis and the climate crisis strongly affect coastal landscapes in many coastal regions worldwide. Evidence shows that the difficulty of governing coastal regions has increased alongside the attractiveness of contemporary societies for settlements near the coastline. There is a growing debate in landscape governance conceptualisation and operationalisation, in landscape research. Despite the significant progress on this theme, empirical discussions on coastal landscapes are scarce, a trend already followed by landscape and coastal planning and management debates, highlighting the need for empirical research. This article explores this research gap, conducting an evolutionary analysis of the governance of the coastal region in Portugal, tracing the co-evolution of its institutions and actors since 1950 to understand whether the landscape concept has been integrated into the governance of the coastal region. Our research design comprised two main parts. Firstly, we conducted a literature review comparing the Portuguese landscape and coastal governance diachronic analysis with the evolution at the European level. Secondly, we undertook a content analysis of the principal legislative institutions over the analysed time frame. Results reveal that Portuguese governance evolution diverges somehow from European trends, particularly after the European Landscape Convention, and show that the integration of the landscape concept into the coastal governance system was strongly dependent on powerful actors, their particular interests, values and stocks of knowledge. Along its evolutionary path, the imperative for coastal landscape governance arises from recognising its pivotal role in addressing the intricate and interconnected challenges inherent to coastal regions, needing further research to advance its theoretical and empirical knowledge.

## 1. Introduction

In recent decades, in many coastal countries, high levels of coastal landscape transformation have been observed due to increasing pressure from urbanisation, industrialisation, and/or tourism, leading to profound losses of biodiversity and landscape values (Antrop & Van Eetvelde, 2017; Williams et al., 2022). At the European level, the process of coastalization (Lagarias & Stratigea, 2023), combined with the implementation of several types of infrastructures and the banalisation of architectural quality (Nogué & Wilbrand, 2018), have been changing the structure, functions and dynamics of many coastal landscapes, questioning their character and identity.

Despite the continuous political and scientific claims of the need to safeguard, protect and enhance coastal regions, economic development, land use change, and urban sprawl continue to cause extensive changes in several social, cultural, and ecological systems across the globe (Rempis et al., 2018). Besides the well-known problems and pressures many worldwide coastal landscapes face, climate change's impacts pose additional challenges for most coastal regions (IPCC, 2022). Rising sea levels, extreme weather events, changing ocean currents and water temperatures are some of the impacts already intensifying these areas' vulnerability, leading to increased habitat loss, coastal erosion and flooding, with rising risks for the human populations living in these regions (IPCC, 2022; Roffman et al., 2023).

In addition, the difficulties of planning and managing coastal regions have increased alongside the attractiveness in contemporary societies of

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0305-9006/© 2023 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

However, despite the growing debate on landscape governance, the body of knowledge on this topic is still relatively small, and the concept still has no consensus about its definition. Discussions are dominated by Kozar's et al. (2014) argument, centred on the governance process and its instruments in the sense of good governance based on the landscape

From an evolutionary governance theory perspective (Beunen et al., 2015; Van Assche et al., 2014), assessing the co-evolution of institutions and actors allows one to understand the governance system because both actors and institutions are interdependent and shape each other over time (Daniell et al., 2020). Governance is not static but rather a

a deductive content analysis approach, adapting the protocol employed by Hersperger et al. (2020), which assessed the role of "landscape" in strategic spatial plans in several European countries, as their protocol followed the present landscape research debate. From this adapted protocol, we constructed an analysis matrix incorporating the most relevant aspects for our research. However, as our analysis covers a significant temporal spectrum, we recognised the need for an inductive

itats and sediment dynamics.

Nature and landscape conservation was the primary goal of landscape practice with the emergence of protected natural areas in several European countries (Antrop, 2013; Olwig & Olwig, 2002). The beginning of this movement is marked by the establishment of the Areas of Outstanding Natural Beauty (AONB) in Britain (1956), the Naturpark in

## Appendix 20 – Gonçalves, C., & Pinho, P. (2025). The governance of the coastal region: evolutionary changes in the conceptualisation and integration of landscape in Portuguese coastal planning institutions. Landscape Ecology, 40(2), 41. **doi:** https://doi.org/10.1007/s10980-025-02053-9

Landsc Ecol (2025) 40:41
https://doi.org/10.1007/s10980-025-02053-9

RESEARCH ARTICLE

# The governance of the coastal region: evolutionary changes in the conceptualisation and integration of landscape in Portuguese coastal planning institutions

**Carla Gonçalves · Paulo Pinho**

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**Abstract**

*Context* Coastal landscapes are unique and fragile socio-ecological systems, yet despite political and scientific efforts toward integrated coastal governance, challenges such as fragmented approaches, multiple boundaries, and inadequate policy integration persist. While landscape governance offers significant potential for rethinking coastal governance by emphasising the integrative power of landscapes, many scientific discussions still employ a binary perspective, limiting its full potential. Additionally, research on how the conceptualisation and integration of landscape has evolved in European coastal planning institutions remains scarce.

*Objectives* This article aims to advance coastal landscape governance research by examining the evolution of the conceptualisation and integration of landscape in Portuguese coastal planning institutions, assessing whether the narrow view found in national laws is reflected at the policy instrument level.

*Methods* We used multiple explanatory case study research to explore the evolution of the conceptualisation and integration of landscape within Portuguese coastal planning institutions from 1978 to 2021, employing qualitative content analysis.

*Results* Findings indicate that coastal plans have increasingly failed to use the integrative potential of landscapes fully. This decline is accompanied by a growing tendency to associate landscape valuation with Nature Protected Areas.

Furthermore, the analysed instruments revealed an increase in references to the landscape over time. However, differing conceptualisations of the landscape emerged, with the unexpected finding that a holistic conceptualisation did not always correspond to high levels of integration. Instead, landscape integration primarily focused on aspects such as multifunctionality, connectivity, and fragmentation.

*Conclusions* Our research underscores the urgent need for more empirical research in coastal landscape governance. From a broader perspective, such research could demonstrate the benefits of leveraging the integrative power of landscapes in coastal governance, potentially contributing to a paradigm shift towards coastal landscape governance.

**Supplementary Information** The online version contains supplementary material available at https://doi.org/10.1007/s10980-025-02053-9.

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(Flannery and McAteer 2020), limited economic and financial resources and insufficient attention to the regional scale also hinder coastal governance

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cultural features (Forman and Godron 1986; Ahern 2006; Wu 2013; Kristensen and Primdahl 2020). It also acknowledges landscape as a visual, sensorial,

underscores the integrative power of landscapes, the importance of incorporating knowledge of landscape systems, and the role of landscapes in promoting

that this dichotomy can be overcomed by adopting a landscape-based approach that emphasises the interconnectedness of nature and culture. This approach

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## Appendix 21 – Gonçalves, C., Pinho, P., & Gonçalves, J.A. (2025). Landscape science, coastal instruments, and landscape change: Evolutionary insights from Portugal. Progress in Planning, 196, 100959. **doi:** https://doi.org/10.1016/j.progress.2025.100959

Progress in Planning 196 (2025) 100959

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# Landscape science, coastal instruments, and landscape change: Evolutionary insights from Portugal

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Landscape approaches

ABSTRACT

Since the mid-20th century, European landscapes, especially coastal regions, have faced significant transformations influenced by global and national trends, mainly driven by coastalisation. While studies have explored various aspects of coastal landscape changes across Europe and beyond, a fundamental gap remains: understanding how the conceptualisation and integration of landscape within coastal planning instruments impact broader landscape change evolution. This study addresses that gap through an evolutionary explanatory multiple case studies analysis of three municipalities in the Northern Region of Portugal, examining how the conceptualisation and integration of the landscape within three regional coastal planning instruments influenced coastal landscape changes from 1965 to 2018. Findings indicate that the degree of landscape integration varies among the coastal planning instruments, directly impacting the level of landscape protection. Our research suggests that higher levels of landscape integration could significantly enhance coastal landscape protection. An unexpected finding emerged regarding the conceptualisation of the landscape. While one might expect that a holistic conceptualisation would lead to high levels of integration, this was not always the case. Results also highlight how underlying narratives, strongly influenced by the European Union, shaped the interpretation and practical management of coastal landscapes. Our research concludes with a call for further empirical research across diverse geographies to deepen understanding of coastal landscape governance. It also emphasises the need for political will to embrace risks and foster a radical, transformative shift to approach and conceptualise the governance system in line with the changing dynamics and socio-ecological values of coastal landscapes towards coastal landscape governance.

## 1. Introduction

Change is an inherent characteristic of landscapes (Forman & Godron, 1986), particularly in coastal regions, where dynamic interactions between land, sea, and human activities drive continuous transformations. However, human-driven changes often have numerous negative impacts, including biodiversity loss, ecosystem fragmentation, and the degradation of natural coastal resources. These changes weaken landscape sustainability (Wu, 2013, 2021) and diminish the ability of coastal landscapes to provide essential landscape services (Van der Sluis et al., 2019). Beyond ecological impacts, such transformations threaten the cultural, perceptual and aesthetic significance of coastal landscapes, reducing their role in supporting local identities, fostering human well-being, and preserving Europe's coastal natural and cultural heritage (Nogué & i Font, 2007).

Since the mid-20th century, European landscapes have experienced significant transformations driven by global and national trends. Processes such as urban expansion, agricultural intensification, land abandonment, forest expansion, international trade, new conservation demands, and renewable energy development have reshaped landscapes

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beyond coastal governance and has been widely discussed in broader contexts (Antrop, 2013; Antrop & Van Eetvelde, 2017; Kühne, 2019), as well as in other specific contexts such as agricultural landscapes (Primdahl, 2018). Different interpretations, whether as an ecological system (Forman & Godron, 1986), a visual entity (Cosgrove, 1985;

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Before detailing these phases, we first explain the criteria for selecting the three case studies (Section 2.1.) and for defining the boundaries of the coastal landscape (Section 2.2.).

ceptualisation and integration of landscape within coastal management institutions influence long-term landscape change. We examine this relationship by analysing LULC transformations in three municipalities in Northern Portugal (Vila do Conde, Póvoa de Varzim, and Esposende). Portugal's extensive and diverse coastline, coupled with its history of

scientific literature. However, they provide an opportunity to trace, describe, and explain how the landscape concept has been integrated into the coastal institutions and how this integration has influenced LULC changes in the coastal landscape of the three municipalities. The location of the three case studies in relation to Portugal, the Northern

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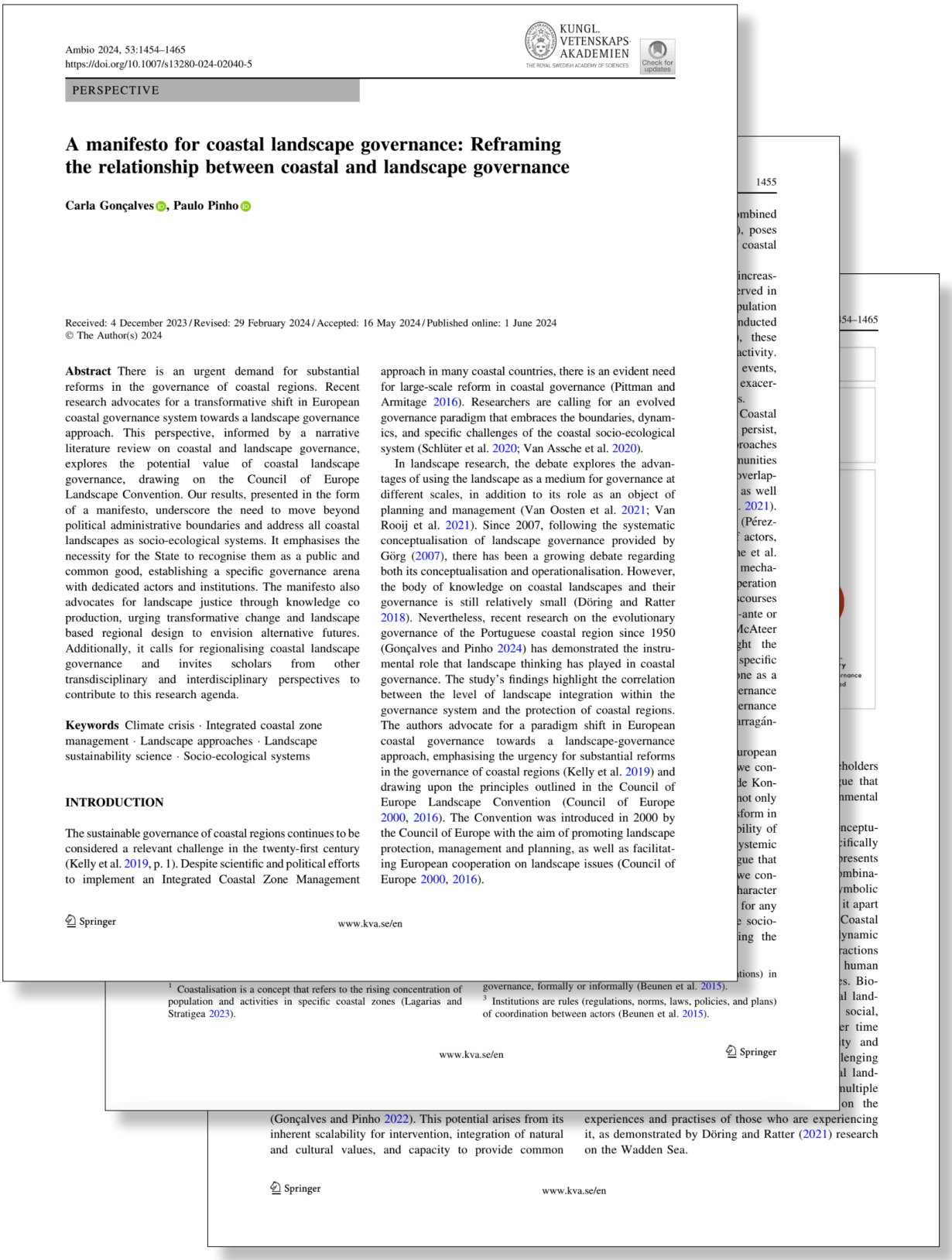
# Appendix 22 – Gonçalves, C., & Pinho, P. (2024). A manifesto for coastal landscape governance: Reframing the relationship between coastal and landscape governance. Ambio. 53, 1454–1465. **doi:** https://doi.org/10.1007/s13280-024-02040-5



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PERSPECTIVE

## A manifesto for coastal landscape governance: Reframing the relationship between coastal and landscape governance

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**Abstract** There is an urgent demand for substantial reforms in the governance of coastal regions. Recent research advocates for a transformative shift in European coastal governance system towards a landscape governance approach. This perspective, informed by a narrative literature review on coastal and landscape governance, explores the potential value of coastal landscape governance, drawing on the Council of Europe Landscape Convention. Our results, presented in the form of a manifesto, underscore the need to move beyond political administrative boundaries and address all coastal landscapes as socio-ecological systems. It emphasises the necessity for the State to recognise them as a public and common good, establishing a specific governance arena with dedicated actors and institutions. The manifesto also advocates for landscape justice through knowledge co production, urging transformative change and landscape based regional design to envision alternative futures. Additionally, it calls for regionalising coastal landscape governance and invites scholars from other transdisciplinary and interdisciplinary perspectives to contribute to this research agenda.

**Keywords** Climate crisis · Integrated coastal zone management · Landscape approaches · Landscape sustainability science · Socio-ecological systems

### INTRODUCTION

The sustainable governance of coastal regions continues to be considered a relevant challenge in the twenty-first century (Kelly et al. 2019, p. 1). Despite scientific and political efforts to implement an Integrated Coastal Zone Management approach in many coastal countries, there is an evident need for large-scale reform in coastal governance (Pittman and Armitage 2016). Researchers are calling for an evolved governance paradigm that embraces the boundaries, dynamics, and specific challenges of the coastal socio-ecological system (Schlüter et al. 2020; Van Assche et al. 2020).

In landscape research, the debate explores the advantages of using the landscape as a medium for governance at different scales, in addition to its role as an object of planning and management (Van Oosten et al. 2021; Van Rooij et al. 2021). Since 2007, following the systematic conceptualisation of landscape governance provided by Görg (2007), there has been a growing debate regarding both its conceptualisation and operationalisation. However, the body of knowledge on coastal landscapes and their governance is still relatively small (Döring and Ratter 2018). Nevertheless, recent research on the evolutionary governance of the Portuguese coastal region since 1950 (Gonçalves and Pinho 2024) has demonstrated the instrumental role that landscape thinking has played in coastal governance. The study's findings highlight the correlation between the level of landscape integration within the governance system and the protection of coastal regions. The authors advocate for a paradigm shift in European coastal governance towards a landscape-governance approach, emphasising the urgency for substantial reforms in the governance of coastal regions (Kelly et al. 2019) and drawing upon the principles outlined in the Council of Europe Landscape Convention (Council of Europe 2000, 2016). The Convention was introduced in 2000 by the Council of Europe with the aim of promoting landscape protection, management and planning, as well as facilitating European cooperation on landscape issues (Council of Europe 2000, 2016).



[1] Coastalisation is a concept that refers to the rising concentration of population and activities in specific coastal zones (Lagarias and Stratigea 2023).

[3] Institutions are rules (regulations, norms, laws, policies, and plans) of coordination between actors (Beunen et al. 2015).



(Gonçalves and Pinho 2022). This potential arises from its inherent scalability for intervention, integration of natural and cultural values, and capacity to provide common experiences and practises of those who are experiencing it, as demonstrated by Döring and Ratter (2021) research on the Wadden Sea.