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## Changing scales: greenways from region to place – the case of the Algarve, Portugal.<sup>1</sup>

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### Abstract

This article aims to reflect and debate around the operational value of the greenway concept, while paramount instrument for landscape planning and management, divided in two parts. The first one focuses on the definition and evolution of the greenway concept and its relations with other fundamental concepts, such as continuum naturale, ecological structure and green infrastructure. In this conceptual approach, the main scope is the importance of accurate criteria definition for greenway design, considering the transposition between different scales. In the latter part of the article, the case study of the Algarve, southern Portugal, is presented, where greenway design occurs at a regional scale, integrated in a system designated as Estrutura Regional de Protecção e Valorização Ambiental (ERPVA, Regional Environmental Protection and Valorization Structure), within the Plano Regional de Ordenamento do Território do Algarve (PROT-Algarve, Territorial Management Plan of the Algarve), setting guidelines for the transposition for the municipal level landscape management instruments. The goal is to assess the challenges, opportunities and constraints enclosed in the scale adaptation process, namely through the analysis of the revision processes of the Planos Directores Municipais (PDM, municipal master plans) of Lagoa and Silves.

### 1. Introduction

Looking back on the origin of the greenway concept, we glimpse the contribution of late nineteenth century/early twentieth century Landscape Architecture, both in theory and praxis, in the United States of America and Europe. The works of Frederick Law Olmsted (Fein 1972) and Jean Claude Nicolas Forestier (Matteini 2019) stand as seminal references for the idea of socio-ecological connectivity in urban context. The concept of greenway first appears, in an embryonic form even though with a marked operational nature, in 1963, on the Greenways and Landcastles proposal for the city of London, by Alison and Peter Smithson (Smithson and Smithson 2005). For the evolution of its meaning and consolidation of operability, the decade of 1990 is a landmark.

Initially defined as an open linear space associated to natural occurrences such as water courses, ridges, riverfronts, scenic routes connecting natural parks, heritage sites, cultural heritage and residential areas (Little 1990), but now serving the protection of ecologically sensitive areas along rivers, shorelines or mountain ranges, greenways are now understood as networks or planned structures of sites tending the conservation of natural and cultural values, whose management tends ecological, aesthetical, cultural, historical and recreational objectives (Fábos 1991).

In terms of its applicability, for the implementation of a strategy based on the establishment of green corridors as instruments of landscape planning, it is necessary, on the one hand, the presence

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of a structure of natural and cultural landscape elements of relevant interest and, on the other hand, a dynamic, visionary and committed promotional action (Flink and Searns 1993). The simultaneous existence of these two factors has enabled the elaboration and implementation of the Lisbon Green Plan which, in the last years of the 20th century, defined a continuous system of green corridors in order to contribute to the effective improvement of the quality of the urban environment and of life in the city (Telles 1997). Another contemporary example is the large-scale strategic project for the metropolitan region of New York – New Jersey – Connecticut, called 4C: Four Corridors ([www.fourthplan.org](http://www.fourthplan.org)) (Regional Plan Association 2017).

But are these concepts, of greenway and green infrastructure, truly operational, and applicable within the exercise of regional planning? Furthermore, are these ideas, and the structures that they project on landscapes, adaptable to different scales and contexts, retaining coherence and functionality?

The purpose of this work is to try to find answers for these questions, in the context of a planning exercise in the Algarve, Portugal's southernmost region, a country which has had relevant contributions, for instance, through pioneering applications of the concept of *continuum naturale* (Cabral 1982; Telles 2003).

## 2. Background and Literature Review

The publication of a special issue of *Landscape and Urban Planning Journal* in 1995 (Ahern & Fabos 1995), reprinted as a special book (Ahern & Fabos 1996) made a decisive contribution to the evolution and consolidation of the greenway concept. The actual term 'greenway' is formed by joining greenbelt to parkway and refers to linear elements of the landscape (highway, routes, railway, riverway) with interest in terms of ecological, recreational, cultural, aesthetic or others in the scope of the concept of sustainable land use. The concept of green corridor was introduced in 2007 and considers the roads as ecosystems, associating the circulation of people, goods, and merchandise, with the circulation of air, water, sediments and fauna, and the propagation of seeds, reconciling in the same space-channel the development of human activities with the presence of wildlife and the occurrence of natural processes (Charris, York & John, 2020).

Although the concept of green infrastructure does not have a single widely recognized definition, it has been adopted by several disciplines related to landscape planning, management, and conservation, which recognize fundamental characteristics such as connectivity, multifunctionality and smart conservation (EEA, 2011). The comprehensive and operative concept of green infrastructure integrates the previously defined notions (greenway and green corridor), and when used to identify a network of interconnected and resilient spaces and natural resources with the aim of protecting them, it approaches the idea of ecological network, in the sense that, as an ecological structure, it reflects the principles of the ecological network (core areas, corridors), contributing to its safeguard and enhancement.

For the semantic evolution of the notion of greenway and its operation in the context of urban and landscape planning, at different scales, many authors and proposals/experiences have made decisive contributions (Fábos and Ahern 1995; Fábos and Ryan 2006; Forman 2004; Pinna and Saiu 2021). The evolutionary and operational profile of the greenway concept, considering the different generations and stages associated with it, is interrelated with other fundamental concepts, whose role and importance in the context of landscape planning, are important to mention. The equally operative concepts of ecological structure (Bridgewater and Thompson 2018; Fromm 2000,) and green infrastructure (GI) (Benedict & McMahon 2002; Mell 2017; Seiwert & Rößler 2020) share, with the idea of greenways, the principles of spatial continuity and ecological

connectivity as a basis to guarantee, in a global design of the landscape, multifunctionality (protection, production, culture, recreation and sport), ecological and physical sustainability, and the resilience of urban regions.

Currently in Europe, greenways integrated in GI are an important planning tool, considered in several strategies and reports by the European Commission (European Commission 2013 2019). In the legal framework of several countries, green infrastructure or green corridors are also considered fundamental tools for the fulfilment of the Green Deal objectives, through the provision of various ecosystem services (Jack Ahern, Cilliers, & Niemelä 2014). At European level, in addition to the definition of consensual criteria for the delimitation of green corridors, it is important to understand how planning are integrating and developing green infrastructure, particularly with regard to the principle of "multiplescales", which recommends that the same themes should be addressed at consecutive scales, from national to local to regional level (Grădinaru & Hersperger 2019). This transposition is fundamental to the functioning of hierarchical systems, such as the landscape, which function simultaneously at multiple scales (J. Ahern 2007). It is at the local scale (municipal and sub-municipal) that green infrastructure can be effective in responding to contemporary challenges related to conservation, climate change and improving the quality of life of populations in both urban and rural landscapes. (Grădinaru & Hersperger 2019).

In Portugal, the development of greenways proposals within municipal and regional scales is a theme of growing importance, as a strategy for territorial intervention, with objectives that match public policy options at both levels (Ribeiro and Barão 2006). These authors have analysed five case studies, located within Lisbon's Metropolitan Area and Portugal's Centro Region, considering the importance of the definition of greenway design criteria, but disregarding the problem of transposition between scales of approach.

Our approach, taking the region of Algarve as a case study, where greenways have been designed on a regional scale (PROTAL, 2007), reveals several gaps in the transposition for the municipal level. This faulty transposition for hierarchically lower plans, namely in the revision of PDM's and, specifically, the ones of Lagoa (PDM, 2021) and Silves (PDM, 2021), has compromised greenways design and its objectives, along with their associated ecological and social benefits.

### 3. Method and Data

As seen, the concept of greenway, as well as that of green infrastructure, is multi-scale. They can be applied at any scale, also transferring its assumptions. In the current Portuguese spatial management system, ERPVA (the closest concept to green infrastructure, in national normative) is defined on a regional scale in Regional Land Use Plans. Its integration in the municipal scale is mandatory. But the operability and effectiveness of this change of scale depends on the methods used in this process, so that the structures defined at a lower scale retain the coherence and functionality of the higher scale.

To analyse this question, three planning instruments in the Algarve region were analysed. One of regional scale, the PROT Algarve (2007) and two of municipal scale, the PDM of Silves (2021) and of Lagoa (2021). By law, the latter two are hierarchically subordinated to the first, locally expressing and adapting directives emanated from the higher level. These municipal-scale plans were selected because they are the most recent in the region, therefore able to comply with the legal obligation of adapting to their local contexts the recommendations and territorial designs of the strategic PROT Algarve. The planning instruments were downloaded from the Internet and, whenever possible, in addition to the legal documents, technical reports and complementary studies

were also analyzed.

For the content analysis of the plans, in order to identify the presence of the greenway concept as well as its principles, the protocol established by Grădinaru & Hersperger (2018) for the comparative study of GI was adapted. In this study, the analysis focuses on the principles for green corridors, here accepted as the same as those that guide green infrastructure development, and include coordination, multifunctionality, connectivity, multi-scale, diversity and identity (J. Ahern, 2013; Hansen, Lorance, Werner, & Stephan, 2017; Hansen & Pauleit, 2014; Monteiro 2020). The adapted protocol includes 26 questions, structured in three sections. The first section records the general data of the plans. The second section identifies the presence of explicit references to the concept of greenways or analogous concepts, trying to understand the degree of importance these concepts assume in the plan, both in written and designed documents. The third section identifies references to the fundamental principles of GC planning and the components of the plans where these were considered.

#### 4. Results

The Regional Plan for the Algarve region (PROT-Algarve) was published in 2007 and revises a previous regional plan dating from 1991. It is a masterplan for the whole region, which articulates Programmes, Strategies and Plans at national level, as well as sectoral development policies (such as Environmental Protection Policies, among others). It constitutes a strategic reference framework for plans at municipal and sub-municipal level, such as the two PDM's considered. Both published 2021, and are intended to function as strategic masterplans for landscape management at municipal scale, locally expressing national and regional policies.

The results of the application of Grădinaru & Hersperger's adapted protocol are shown in Table 1:

**Table 1 - comparative analysis of greenway approaches in regional and municipal plans in the Algarve**

<sup>a</sup> 1 – not considered; 2 – no coordination; 3 – weak coordination; 4 – strong coordination

<sup>b</sup> 1 – not considered; 2 – poor consideration; 3 – detailed consideration

<b>I – General aspects</b>			
Name of the plan	Plano Regional de Ordenamento do Território do Algarve	Plano Diretor Municipal de Silves	Plano Diretor Municipal de Lagoa
Year of approval	2007	2021	2021
Type of plan	Regional strategic	Municipal	Municipal
<b>II – Regarding how greenways are addressed in the plan</b>			
Does the plan provide a greenway definition?	No	No	No
Is the greenway concept mentioned in the plan?	Yes	No	No
If the greenway concept is not specifically mentioned, are there other objectives in the plan that can be linked to it?	Regional Environmental Protection and Valorization Structure	Municipal Ecological Structure	Municipal Ecological Structure
In which sections of the plan are greenways (or equivalent concept) addressed?	Chapter III, sections 1 and 2, and Chapter IV	Article 117	Articles 9 and 10
<b>III – Planning principles</b>			
<b>Coordination with other strategic planning domains <sup>a</sup></b>			

Is greenway planning coordinated with water management planning?	4	4	4
Are greenways coordinated with climate change mitigation?	1	1	2
Are greenways coordinated with food provisioning?	2	1	1
Are greenways coordinated with quality of life improvement?	2	2	2
Are greenways coordinated with air quality improvement?	2	1	1
Are greenways coordinated with cultural assets conservation?	1	1	4
Are greenways coordinated with other domains?	2	2	2
<b>Multifunctionality of greenways<sup>b</sup></b>			
Are ecological functions considered?	3	3	3
Are social functions considered?	1	1	1
Are economic functions considered?	2	1	1
Are cultural functions considered?	1	1	3
<b>Connectivity of greenways<sup>b</sup></b>			
Is structural connectivity considered?	3	3	3
Is functional connectivity for animal and plant species considered?	2	2	2
Is functional connectivity for humans considered?	1	1	1
<b>Multi-scale planning<sup>b</sup></b>			
Does the plan refer to greenways as part of a national network?	1	1	1
Does the plan refer to greenways as part of a regional network?	3	1	1
Does the plan refer to greenways elements at municipal level?	1	3	3
Does the plan refer to greenways elements at neighbourhood level?	1	1	2
<b>Identity<sup>b</sup></b>			
Are greenways designed to allow users to establish/strengthen local identity?	1	1	1
<sup>a</sup> 1 – not considered; 2 – no coordination; 3 – weak coordination; 4 – strong coordination			
<sup>b</sup> 1 – not considered; 2 – poor consideration; 3 – detailed consideration			

The results indicate that although the greenway concept is not absent from the analysed plans, at least from the regional plan, other concepts used, which can be linked to a greenway approach, prove to have lacunae, as many of the characteristics of a "true" greenway are not considered.

This becomes obvious in terms of planning principles such as coordination with other strategic planning domains and multifunctionality. Coordination between domains in these plans reveals itself incomplete in many and relevant features, while these "equivalent" concepts and their spatial expression focuses only on ecological aspects, with all other functions of greenways having little expression.

But perhaps the connectivity and multi-scale planning principles are the ones which come shorter, in terms of an effective approach to greenway conceptualization. Although structural connectivity is widely considered, its effectiveness in functional terms derives mostly from other planning

instruments (namely Natura 2000 sites or watershed management), which are referred to, but without any specific adaptation to the plan's scope. Multi-scale planning is absent, with each plan only considering its own scale, and without even considering the existence of others. This is particularly significant when we consider that municipal ecological structures must express locally the wider ERPVA, defined by PROT-Algarve, on a more broad, comprehensive and hierarchically higher level.

## 5. Discussion and Conclusion

Greenway planning is identified as an international movement which arose from Landscape Architecture theory and practice from the Nineteenth century on, consolidating throughout the twentieth century (Fábos 1991). From preceding conceptualization to current days, the evolution and consolidation of the greenway theory and practical application, within the scope of landscape intervention, at different scales, has given it a fundamental role and importance in the context of both strategic landscape planning and urban and environmental policies.

The growing success of the greenway concept, in different geographies and socio-economical contexts, is due to its efficiency in reaching objectives, whether in terms of landscape safeguard, heritage protection or creation of sports and leisure public spaces. For this, the principles of delimitation of greenways, consensually adopted at European level, greatly contribute.

Considering these principles and a recently defined protocol/analysis methodology, a comparative study was developed within the scope of this investigation, which focused on the analysis of three territorial management instruments in the Algarve region, at consecutive scales: the regional plan and two PDM's. Although the PROT-Algarve considers the generality of the principles for the delimitation of greenways, it is verified that the understanding of these corridors prevails only as a tool to safeguard and protect natural values, a dated vision that can perhaps be justified by the date of elaboration of this plan. The faults detected in both PDM's are harder to explain.

Despite issues related to multifunctionality being mildly addressed, it is also noted that the ERVPA transposition to hierarchically lower plans occurs mostly in the cartographic components of the PDM's, and basically through the consideration of natural values, through core areas (mostly classified areas under Natura 2000 and/or natural parks and other protected areas) and some corridors, associated with the hydrographic network. It yet remains distant from an understanding in which it is seen as a fundamental and operational structure for providing integrated and articulated services, connecting different but interdependent planning domains.

Although PDM's are intended to function as strategic plans for the local scale, this failure to fully incorporate and locally express broader guidelines and territorial designs somewhat betrays that intended nature, thus transforming them into a merely immediate and local tool. Disconnected from national and regional strategies, they interrupt the process of global landscape design, which ensures continuity and coherence throughout different scales and locations.

As shown in our background and literature review, there is widespread technical consensus regarding fundamental aspects of greenway design. If so, which unbalancing factor causes such faults in state of the art planning instruments, such as the ones analysed?

The political decision component of the planning process in Portugal, at all levels, is heavily conditioned by partisan – and related interests – driven options. This conditions the margin for local agents to freely and dully interpret and design planning or management instruments. It also introduces frailties on the necessary equilibrium between the political and technical components of landscape planning, and consequently, management. The lack of a dynamic, visionary and committed promotional action, as postulated by Flink and Searns (1993), is revealed in the gaps

identified in our study.

This shows that a long path is still ahead of us in terms of regulation and operation of greenways, to the point of finally understanding it in the same way as other infrastructures, throughout the territory.

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