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The protection of landscape as a resource

Case study – Monte da Guia protected area (Faial-Azores)

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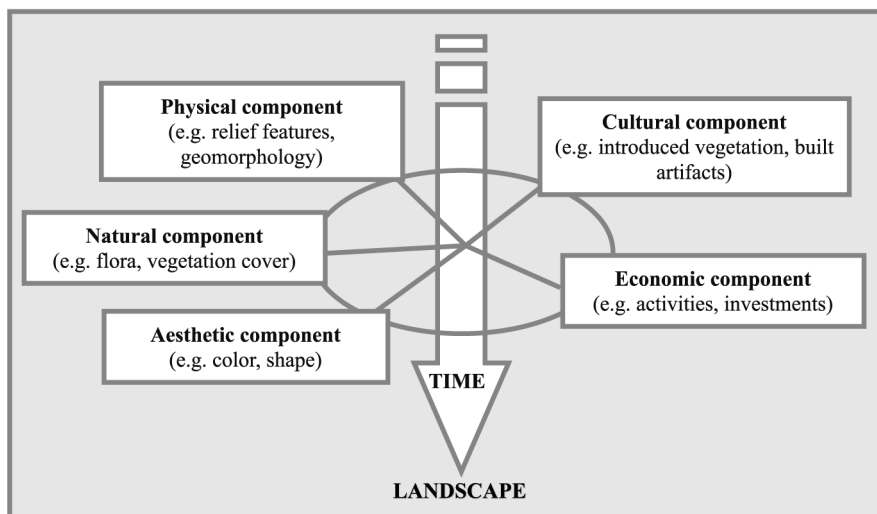
Keywords *Biophysics, Environmental management, Resources, Portugal*

Abstract *The evolution of the concept of landscape to incorporate components like cultural and socio-economic factors, in addition to the natural and aesthetic features, influenced the perception of landscape as a resource. On the other hand, the relationships between territorial features as well as the understanding of their temporal dynamics determine the significance of these features for the quality of a landscape and, consequently, for its conservation. This implies that all components – natural and physical, but also cultural and visual – upon which landscape quality is assessed, ought to be considered and studied globally. Natural resources and cultural heritage, however, are usually considered independently when developing protected areas management plans. Here, we present a methodology developed for the Monte da Guia management plan, which allows the interrelated analysis of landscape factors such as geology, geomorphology, pedology, flora and vegetation cover as well as the cultural and visual characters. Using the concepts of biophysical sensitivity and visual quality, we evaluated the relevance of these various factors for the determination of the state of equilibrium/degradation of a landscape, and hence for its conservation value. This methodology may contribute to the development of improved zoning maps and management guidelines determining land use and management strategies for the conservation of individual resources that, together, determine landscape quality.*

Introduction

The European Landscape Convention[1] conceives 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 definition reflects the notion of evolution through time and reinforces the idea of landscape as a whole, where natural and cultural components are indissociable. Accordingly, landscape should be understood as a resource composed of the assembly of natural, physical, cultural, economic and visual components, and not only as their sum (Figure 1). From a sustainable development perspective, the protection of this resource requires actions “to ensure the upkeep of the totality of characteristic features of a landscape justified by its heritage value derived from its natural configuration and/or human activity” (European Landscape Convention.





Note: The figure illustrates landscape as a result of the inter-relations and dynamic equilibrium between the different components, and its evolution through time

Figure 1.
Conceptual diagram of
landscape resource

Protected areas management plans (PAMP), as a type of landscape planning, aim to produce technical reports and zoning maps with guidelines and strategies to ensure the preservation of the characteristics that determine the quality and/or uniqueness of a landscape, through assigning land uses to the most suitable places (Turner, 1995; Marsh, 1991; McHarg, 1969). Generally, these plans are drawn upon methodologies in which natural and physical components are studied and assessed as separate entities, despite their interconnectivity. On the other hand, the cultural character of a landscape expresses the interaction of man with the territory. As such, this interaction is a display of socio-cultural influence and allows the acknowledgment of the connection between specific site features and the history of a society, thereby contributing to the uniqueness and identity of a landscape. Furthermore, landscape quality today is endowed with economic value (e.g. for tourism). Elements like historical, cultural, economic or aesthetic factors thus demand a joined and interrelated approach in which the relationships between them and with the physical and biological factors would be considered among the assessment criteria, because nature conservation together with the preservation of the cultural heritage of a territory values the landscape (McHarg, 1969; Lyle, 1985). In the present case study, Monte da Guia protected area, the methodological approach was based on the analysis of natural, physical, visual and cultural components, with emphasis on the dynamic relations established between them. This holistic evaluation allowed the establishment of a zoning map and the definition of protection measures.

Development of the Monte da Guia management plan

The methodology developed for the management plan of the Monte da Guia protected area (Faial Island, Azores Archipelago, Portugal) refers to a holistic concept of landscape as a resource, in which the various components like geology, geomorphology, pedology, relief, flora, vegetation cover and cultural heritage are analysed and evaluated assuming their inter-relations and dynamic equilibrium. It is based on the relevance of natural components, the constraints indicated in territorial plans and management servitudes (Guerra, 2000) and the cultural and visual character of the landscape (McHarg, 1969; Zube *et al.*, 1975; Ribeiro *et al.*, 2002). The interdisciplinary and parametric methodology was structured in three phases:

- (1) landscape analysis;
- (2) synthesis (biophysical sensitivity and visual quality); and
- (3) management plan (zoning map and guidelines), as shown in Figure 2.

In the first phase, a series of landscape components were identified and characterized, namely relief features, geology-pedology, geomorphic dynamics, flora, vegetation cover and historical-cultural heritage. The latter component, which is rarely assessed in PAMP, is important as patrimonial character that needs to be protected, but also as a mean to understand how man's presence shaped the territory through various actions and activities (e.g. agriculture, religion, recreation) and influenced the evolution of the landscape. The cultural component was assessed through its historical-cultural significance and integrity, that is, the capacity that features have to reflect past periods and events, on the basis of the physical remains and their relation with the surrounding landscape (McClelland *et al.*, 1991). For this purpose, the history

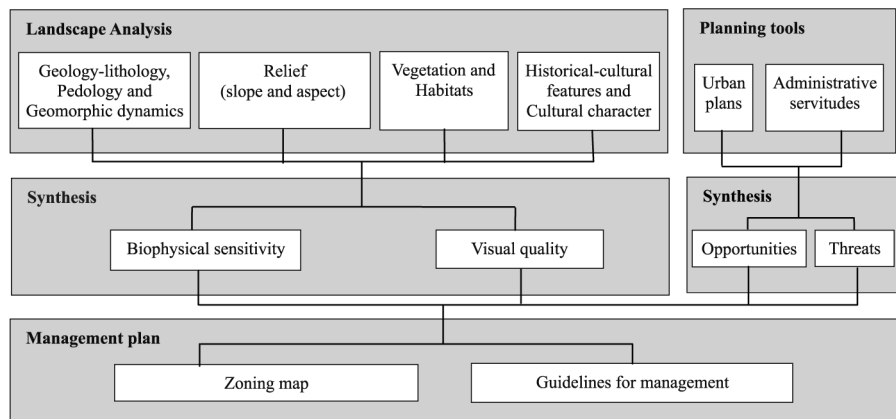


Figure 2.
Monte da Guia
management plan
methodology

Note: The geographical information system (GIS) function of the software Arc View 3.2a (Environmental Systems Research Institute, ESRI) was used to derive slope, aspect and hypsometric analysis, allowing the production of a digital terrain model (DTM) and granting the possibility to perform spatial intersection operations

(social, cultural, religious, economical and political aspects) of the location was studied to identify and characterize all features with respect to their antiquity, state of conservation, relevance to the understanding of the territory's occupation, actual use and importance to the maintenance of the character of the landscape. Urban plans and administrative servitudes were also analysed and taken into consideration.

The objective of phase 2, the synthesis phase, was to diagnose the conjoint importance of the characterised features for landscape quality and to evaluate its susceptibility to degradation, in order to delineate areas with special value for conservation. Here, the concepts of biophysical sensitivity and visual quality were devised in order to classify the territory in sub-areas, and assign a value to them. The delineation was based on the geographic co-occurrence of significant ecological, natural, historical-cultural and recreation resources (Lewis, 1964; Dawson, 1995; Fabos, 1996).

Based in landscape sensitivity concept (Marsh, 1991; McHarg, 1969; Câmara, 1983), biophysical sensitivity allows assessing the degree of vulnerability of those components of the landscape with respect to impacts of natural origin and pressures of human nature (Ribeiro *et al.*, 2002). The parameters used in the evaluation, geomorphology-pedology, geomorphic dynamics, vegetation cover and habitats, were assessed for their conservation value in an insular or Azorean context (e.g. the presence of endemic plants) and for their fragility and/or instability resulting from natural or human activities (e.g. trampling, marine erosion). Visual quality "is an evaluation method that intends to synthesize the scenic value and the cultural character of a landscape as well as their sensitivity to human activities" (Ribeiro *et al.*, 2002; Shannon *et al.*, 1995; Bureau of Land Management, 1975). Landscapes with high visual quality are usually more sensitive and, therefore, more prone to degradation (Câmara, 1983). The following parameters were considered: ridgelines, slope, aspect, cultural character, geomorphology-pedology, geomorphic dynamics, vegetation cover and habitats. These components were analysed for their relevance to the visibility of an area (e.g. diversity, contrast) and their aesthetic value, a subjective measurement that relies on the professional experience and judgment of the observer.

Biophysical sensitivity and visual quality evaluations were obtained through the weighed combination of the specified parameters previously ordered according to their significance. The observation of the biophysical sensitivity map (Figure 3) allows the conclusion that the majority of the Monte da Guia territory is highly sensitive due to the presence of regional endemic plants (e.g. *Erica scoparia ssp. azorica*) and of vast areas submitted to intense morphogenesis processes. This evaluation is crucial for the establishment of a management plan because it indicates the existence of various zones with high susceptibility to start or increase degradation dynamics leading to the loss of natural resources.

Similarly, the knowledge of the spatial distribution of the most significant visual areas is necessary to the guidance of human presence and interventions

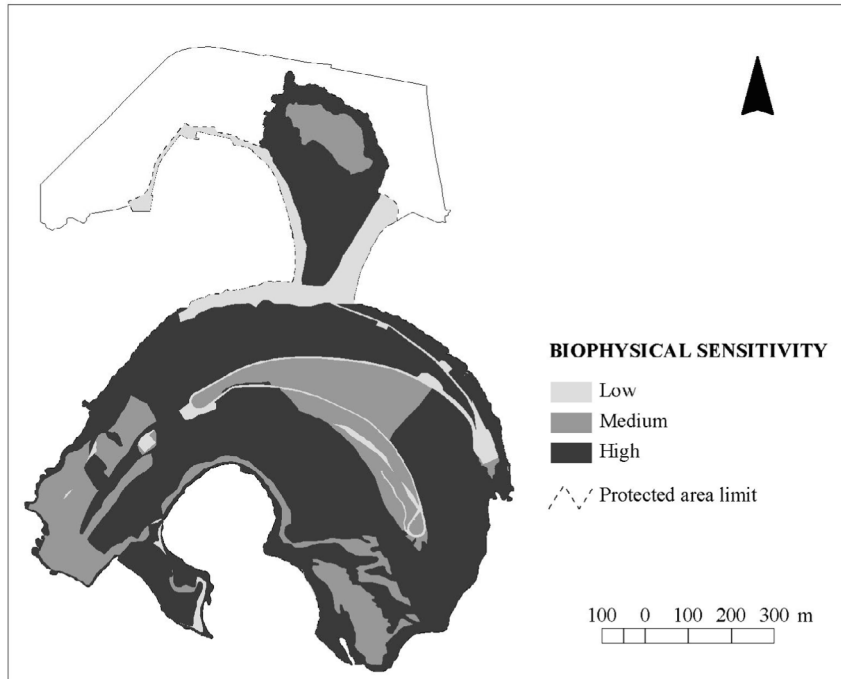


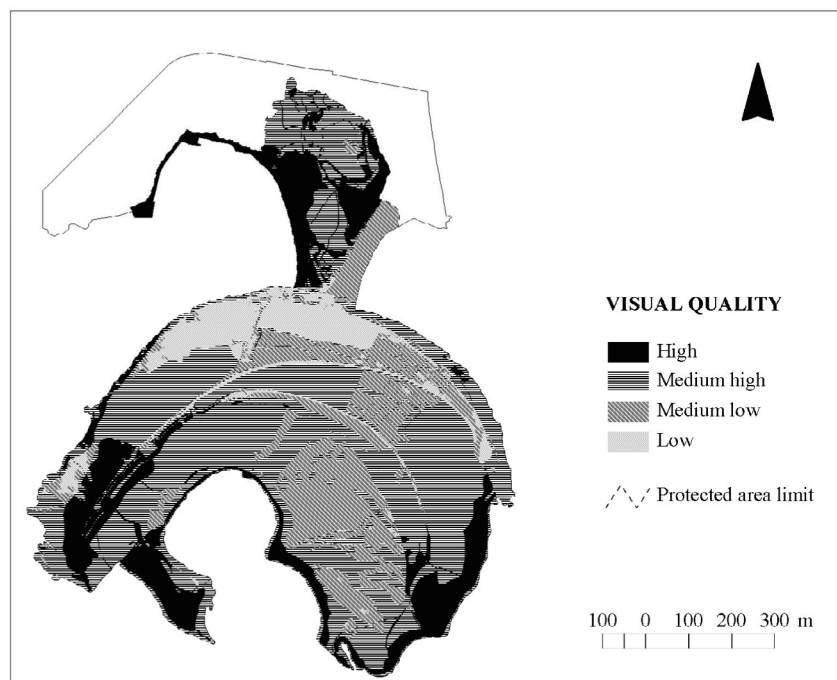
Figure 3.
Biophysical sensitivity
map of Monte da Guia

Note: The map, obtained using GIS ability for spatial intersection operations, intends to illustrate the geographic distribution of the territory's susceptibility to degradation of natural of human origin through a qualitative scale

inside the studied site in order to ensure its conservation. The visual quality map (Figure 4) shows the predominance of high quality locations in the Monte da Guia protected area, as a result of the combined presence of features of high visual richness. The analysis of cultural heritage and its historical significance played an important role in the assessment of visual quality as it earmarked some areas that, otherwise, would not be highlighted for preservation. Indeed, these areas are located in disturbed zones displaying no stable geological condition or relevant vegetation cover, which are features that are usually compulsory for an area to be valorised in protection plans.

The synthesis phase also took into consideration the evaluation of the planning tools with respect to potential opportunities (e.g. legal protection acts that prohibit construction) and threats (e.g. mobile phones antennas), and their impact on the establishment of the plan's main objective – conciliation of nature conservation and human presence without disrupting landscape quality. These data were particularly relevant for the proposal of guidelines measures.

In the last phase of Monte da Guia PAMP development, a zoning map was established where the different areas were ranked according to their natural



Note: The map, obtained using GIS ability for spatial intersection operations, intends to illustrate the geographic distribution of the landscape's scenic value and cultural character through a qualitative scale

Figure 4.
Visual quality map of
Monte da Guia

and cultural value as well as their integrity, allowing the definition of management strategies for conservation, rehabilitation and human use. The Plan, which is currently under public reviewing, will be made available after completion of the procedure.

Conclusion

The aim of Monte da Guia management plan was to achieve an effective and coherent management zoning taking into account the dynamic evolution of a landscape as well as its cultural and visual aspects, in order to ensure the conciliation of nature conservation and the presence of man.

The study was made possible through a methodological approach based on the concept of landscape as a resource, which enabled classification of the territory according to a hierarchical system with respect to its susceptibility to natural and human degradation. Recognising the importance of dynamic processes and inter-relations between components for the interpretation of the genesis and evolution of the landscape was crucial to understanding how the territory would react in different situations and to help decide on appropriate ways to intervene. The approach also allowed incorporating historical-cultural

testimonies of human occupation of the territory as earmarks of the landscape, which, similar to the natural features, deserves protection.

The Monte da Guia case study demonstrated the feasibility and relevance of a methodology that could be applied systematically for the development of management plans for protected areas where natural and non-natural features are valuable. It can therefore be expected that understanding landscape as a resource and its integration in methodological approaches for the development of PAMPs and other kinds of landscape planning will lead to improved preservation and management policies.

Note

1. European Landscape Convention, available at: www.nature.coe.int/english/main/landscape/conv.htm

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