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Heading for a post-modern landscape — Portuguese trends in the reconciliation of environmental quality and landscape planning with economic development

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ABSTRACT

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The absence of ecological principles in traditional planning has theoretically been overcome by the adoption of the concept of sustainable development. However, this concept has been bypassed by the political mainstream. Policies designed to improve environmental quality appear to be largely ineffectual. Therefore, landscape planning integrating ecological and economic principles needs to be widely emphasized and practiced. The new landscape would then be the expression of a post-modern relationship of human beings with nature.

In light of these ideas, an overview of Portuguese trends is presented, examining the reconciliation of environmental quality and landscape planning with economic development and exploring existing opportunities for the creation of post-modern landscapes. Through a case study in northern Portugal, one of the existing legal instruments for landscape planning is discussed.

INTRODUCTION

A post-modern landscape should express a new relationship between human beings and nature through the application of ecological principles to development strategies. The traditional perspective of planning based on economic principles has been challenged by a call for the integration of ecology into the planning process. The 1987 report *Our Common Future* from the World Commission on Environment and Development popularized the concept of 'sustainable development', as a means of permitting development compatible with ecological stability. Sustainable development challenges the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs. However, it has become a concept (Rees, 1990) embraced by the political mainstream and has lost its original concern with ensuring ecological stability in spite of the evidence that we can no longer afford the luxury of 'trading-off' ecological damage for economic benefits. Rees (1990) argues that "true sustainability requires that we recognize the reality of ecological limits to material growth and the need to live on the interest of our remaining ecological capital".

The environmental awareness movement that started in the 1960s in the United States

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and then spread to Europe and the rest of the world, occurred at a moment of crisis in the faith in development, understood and practiced as an economic process without regard for basic ecological principles. Water, air and visual pollution had started to envelop society in an oppressive way. Gone was the ancestral instrumental and individual relationship with nature for the provision of daily needs. The industrial revolution created a new relationship with nature that resulted in a landscape associated with the phenomenon of environmental degradation. The pre-industrial environment had not necessarily been a 'better' one for human communities but certainly had been 'better' for the balance of nature.

A growing refusal to live with pollution led to the development of an environmental consciousness. The obvious solution was prevention by eliminating the causes of pollution. Yet this remained impractical while the energy levels required to sustain current standards of living supported immense economic activity, seen by many as the panacea of development. Responses to this problem, have mainly been compromises expressed as definitions of permitted levels of pollution. The United States Environmental Protection Agency has been a leader in setting up standards for emissions of pollutants into the air, water and soil. However, policies setting limits on pollution levels fail to solve the problem of eliminating the source of the pollution and reflect a circumscribed understanding of the environment. The problems tend not to be solved, just postponed, as epitomized by the famous phrase 'not in my backyard'. As well as the definition of environmental quality standards, the Environmental Impact Study (EIS) was set up to fight environmental degradation and achieve environments of quality. It was intended that the EIS be used prior to the approval of a project. However, constructors and developers in general consider the EIS to be a new obstacle in the approval process, and, except for very rare exceptions, there has been a tendency for its use only after the activity or project has been approved and often already assigned to a particular site.

The improvement of environmental quality requires the integration of economic and ecological principles. It is no coincidence that economy and ecology share the same root in the Greek word 'oikos'. Ecology, originally spelled oecology, became a discipline in the late 1800s. The term appeared as a more scientific substitute for oeconomy, used in the seventeenth century to refer to the divine government of the natural world at a time when people debated the possible compatibilities of natural science and religion. During the eighteenth century, the term came to denote the rational ordering of all material resources in an interacting whole (Worster, 1985).

The origins of ecology tend to be interpreted in a variety of ways. McIntosh (1982) provides us with a thorough overview of the antecedents, emphasizing the authors who favor the importance of Darwin for its establishment. Worster's (1985) thesis on the dual origins of ecology in the eighteenth century has been contested by some historians of science but favored by ecologists (McIntosh, 1982). Worster argues that the roots of ecology are to be found in two attitudes of man towards nature: the arcadian and the imperial. The first he sees epitomized in Gilbert White's *Natural History of Selborne* (1789), a natural history essay advocating a simple life in peaceful coexistence with other organisms, and the second in Linnaeus' *The Economy of Nature* (1749), a description of the harmony found in nature that reflects God's wisdom. Contemporary ecology is the expression of both scientific and ideological principles, reflecting people's understanding of their new relationship with nature. Its importance has grown in conjunction with the increasing awareness of the seriousness of environmental degradation. Ecology has become recognized as the science that can provide a more effective basis for the management of natural resources, perceived as scarce by

George Perkins Marsh, who first denounced the destructive effects of human actions on the environment in *Man and Nature*. This book, published in 1864, was instrumental in the development of ecology and subsequent conservation movement.

Since the 1950s, the focus of ecology has been on the productivity of ecosystems, energy flow and nutrient cycling. In 1939, the term 'landscape ecology' was coined and first used by geographers and biologists, and later by applied ecologists such as landscape architects, foresters and planners. It was a response to the critical evolution of the meaning of the term landscape within geography and landscape architecture. It still acknowledges its original artistic, aesthetic and scenic content, but far more important is its connotation with the spatial and temporal realities of the total environment. Landscape ecology became a discipline focused on the study of the landscape, understood as a higher ecosystematic level of which people are an integral part.

Landscape planning offers the opportunity to reconcile ecological and economic principles and thus to achieve environmental quality. It is a guide for development that takes into account the suitability of the landscape for different activities according to its ecological dynamics and quality, and concern for the least social cost and the most varied opportunities to meet people's needs. However, to effectively address the problems, it needs to be accompanied by a change of society's patterns of consumption and production.

THE PORTUGUESE SCENARIO

This overview of the Portuguese scenario looks separately at the most significant aspects of the policies on landscape planning and environmental quality within the national framework and the context of the European Community (EC).

Landscape planning has been practiced in Portugal for nearly 30 years, but only since the 1980s has become widely used. Before then, it was almost exclusively practiced by landscape architects who, led by Professor Caldeira Cabral, represented a small minority of the professionals involved in urban and regional planning. Environmental degradation became a significant problem in the 1970s as a result of Plans of Development emphasizing heavy industry, paper production, textile and chemical industries based on thermal energy produced from imported coal and other fuels. In terms of land-use change and environmental degradation, another relevant phenomenon has been that of tourism, particularly along the coast. At the same time, in addition to normal population growth, the migratory pattern has significantly affected land use. First, in the 1950s and 1960s, there was a high level of emigration to Europe, Africa and the Americas and also to urban centers in Portugal itself, mainly on the coast. In the mid-1970s, immigrants and refugees from Africa began to enter Portugal in significant numbers. This new population with its entrepreneurial flair was a revitalizing factor, particularly in the interior of the country, and outside of the main metropolitan areas of Lisbon and Oporto.

The years 1982 and 1983 were a time of intensive effort to define national policies for the implementation of landscape planning principles. In 1982, two instruments were created: the National Agricultural Reserve and the Town Master Plan. The first aimed at the inventory and protection of the 12% of prime land suitable for agriculture, and the objective of the second was the definition of the principles and rules of land use, the support of towns' development strategies and plans of activity, and the integration of the Plans with other planning levels. The Town Master Plan had an antecedent in the Urbanization General Plan, enacted in 1971, which covered only urban areas, or areas likely to be developed. In 1983, two new instruments were created: the National Ecological Reserve and the Land-Use Regional Plans. The first aimed to safeguard the fragile

ecosystems and heritage landscapes threatened by development and the second defined land-use norms for regions economically and ecologically homogeneous. Another decree that should be mentioned is the Classification of Protected Areas (Natural Reserves, National Parks, Sites and Protected Landscapes), in 1976. Between 1988 and 1990, after Portugal joined the EC, this legislation was revised. At present, the most significant investment is in preparing Town Master Plans for over 300 towns, to be ready by 1993.

Environmental policies emerged with the passage of the Law of Environmental Bases in April 1987, the European Year of the Environment (Portugal joined the EC in 1986). It was a progressive law and helped to promote an awareness of environmental issues. However, its aims are unclear. The first chapter sets out environmental policy as the Law's only objective, but Chapter 4 puts together instruments for environmental policy and landscape planning. This reveals a perception of the connection between environmental quality and landscape planning although their mutual dependency is not defined. The Fourth Environmental Program (1987–1992) approved in October 1987 and inspired by the European Single Act (1987), defines four priorities: the prevention of pollution, the improvement of natural resources management, the promotion and participation in international activities and the development of instruments for the implementation of the program. Landscape planning does not appear as a main or clear support of the environmental policy.

The Law of Environmental Bases implied the regulation of levels of pollutants in water, air, soil and living beings, as well as setting conditions for the protection and improvement of environmental quality, the terms to satisfy an EIS, its content and the designation of the various entities involved in the license process. The decree on EIS was published and came into effect in 1990, directly derived from the EC Directive on EIS of June 1985. In both, the assessment of environmental impact means taking into consideration the following factors: human beings, flora and fauna, soil, water, air, climate, landscape, interaction between any of the foregoing, material assets, and the cultural heritage. It should be noted that all the environmental factors are relevant for the landscape that is the result of their interplay. The EIS makes it necessary to define the reference situation that calls for landscape assessment, which is best performed through a typical procedure that includes the factors inventory, analysis, and synthesis. Once more, the need for landscape planning to support environmental policy becomes evident.

The noise decree was published immediately after the Law of Environmental Bases, in 1987, but decrees relating to water quality and air quality were not published until 1990. Since 1985, various decrees have been published, defining permissible levels and management rules for industrial waste and chemical substances. All these decrees have a corrective intent rather than seeking to prevent environmental degradation — the first principle of all environmental policies.

In spite of their relative limitations, the effectiveness of environmental policies in general has to be acknowledged, particularly in international agreements such as on the reduction of sulfur emissions from power plants, or the levels of pollutants in car exhaust fumes. The next step for environmental policy is to apply corrective measures for existing environmental degradation and to establish preventive principles for new activities, guided by landscape planning.

Landscape planning and environmental policies remain somewhat independent entities which are likely to come together in the near future. The practice of landscape planning implies making a priority of ecological principles as mentioned earlier. However, to complete this overview and explore the opportunities for the Portuguese post-modern landscape, it is necessary to look at recent economic developments, particularly in light of the EC.

The first 3 years of Portugal's membership of the EC were founded on the Regional Development Plan (1986). The revision of the structural funds in 1988, approved specific funds for development programs, namely for industry and agriculture, in addition to the European Regional Development Fund (ERDF), the European Agriculture Guidance and Guarantee Fund (EAGGF) and the European Social Fund (ESF), all integrated into the Regional Development Plan (1989–1993) and the Community Support Framework (1989–1993). These funds have been largely invested in infrastructure and education and professional training (ESF). These economic development funds, namely the ERDF and the EAGGF plus other public and private investments, significantly affect the Portuguese landscape. Unfortunately, the timing has not been coincident with the conclusion of the existing instruments of landscape planning, namely the Town Master Plans. The result is strong pressure on a legal framework which is still fragile and relatively untested.

This gap between landscape planning and environmental policy, and economic development raises serious questions about the likelihood of a post-modern landscape being achieved in the near future. Why is this? Present policies ignore the essential components of the landscape where there will be enormous effects. They also use what Relph and Helm (1991) call rational patterns of land use which disregard elements of the landscape such as the millenarian processes of agricultural production and the people involved in the maintenance and creation of such landscapes which are still ecologically and aesthetically balanced. Instead, "the obvious result of the generalizing process is standardized placeless environments" (Relph and Helm, 1991).

However, interesting opportunities are starting to appear as the Town Master Plans develop. Most of the towns have potential as major contributors to the National Ecological Reserve and the National Agriculture Reserve, which in most cases are coincident. These areas may coincide with areas that are being abandoned by the population, or with unique cultural landscapes, still the home of a decreasing rural population knowledgeable about instrumental, ecological and symbolic relationships with nature. These areas must be converted into opportunities because they have been part of a pre-industrial landscape and best exemplify the short cut which can be taken between modern land development and the post-modern landscape. They are suitable for agriculture or forestry as well for nature conservation and recreation. The protection of such areas of national interest should create indicators to a local right of the towns to be compensated economically so that they can enhance such assets.

A CASE STUDY IN NORTHERN PORTUGAL

The Fourth Environmental Program calls attention to the need to take preventive measures concerning events interfering with the environment and landscape. One of the instruments that Portuguese Law provides for this is the delineation and management of the National Ecological Reserve, which is more precautionary than the EIS for the reasons already mentioned concerning the timing of EIS intervention—generally after decisions, irreversible in many cases, have been taken.

This case study explores the opportunities created by the decree of National Ecological Reserve to identify the areas for ecological protection in the preparation of a Town Master Plan in Esposende. The Town Master Plan is an instrument to define the spatial structures of the town, including building rights, taking into consideration development objectives, distribution of economic activities, housing needs, services, utilities and communications. It follows a regulation that is supported by two key maps: Zoning and Restrictions. The first defines land units based on the

dominant use and establishes management units. The second indicates the restrictions resulting from the National Agriculture Reserve, National Ecological Reserve, Protected Areas, forestry plans and heritage protection areas.

Situated by the estuary of the River Cávado, Esposende overlooks the Atlantic and is approximately 60 km north of Oporto. The diversity and quality of its natural resources, including a seashore 16 km long, are a major asset for the town's development. However, high human demand on a fragile ecosystem calls for careful land-use restrictions in order to insure the perpetuation of the resources. Thus, within the scope of the Town Master Plan, the National Ecological Reserve along with the National Agricultural Reserve are major legal land-use instruments. In addition, in 1989 the

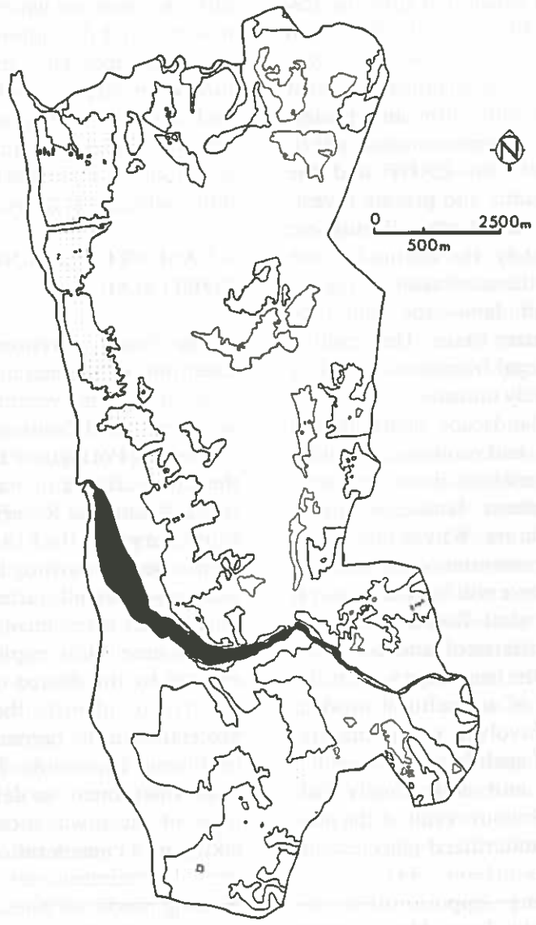

Fig. 1. The darkest area represents the River Cávado, dotted areas correspond to the lands classified as National Agriculture Reserve.

coastal area of Esposende was classified as a Protected Area under the name Esposende Coastal Protected Landscape.

The decree of the National Ecological Reserve is very broad in scope in order to encompass the wide variety of landscapes existing in the country. Its delineation in Esposende involves adaptation to the region's particular and distinct characteristics. As landscape diversity is one of the major features of this small municipality, three homogeneous areas were defined (seashore and riverbanks, cliffs, inland areas) and legislation was applied differently to each.

The biophysical characteristics of this municipality favor the delineation of a large percentage of its area as National Ecological Reserve. However, in order to achieve a balance

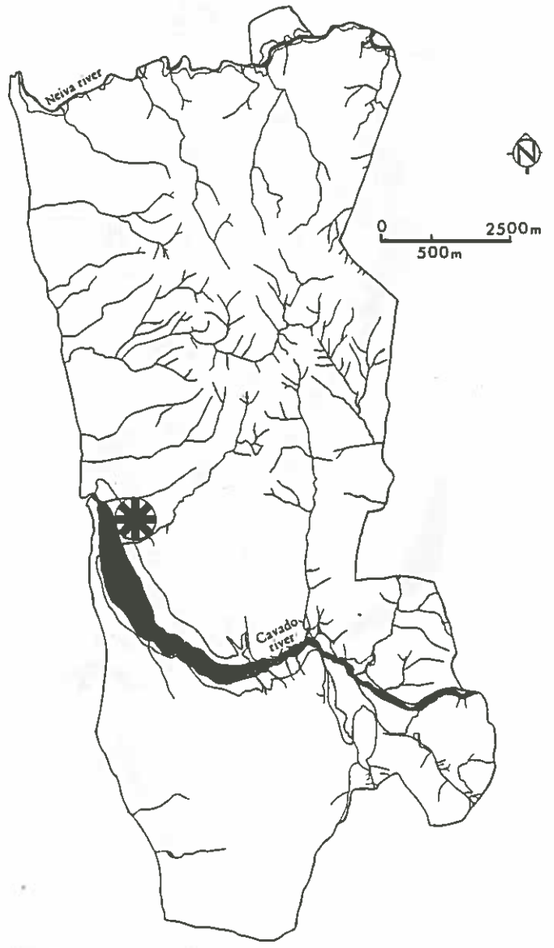

Fig. 2. The flood plains.

between ecological concerns and pressure from developers, it is intended that this law is used to select priority areas for ecological balance and for resource maintenance and to which the restrictions of the decree should be strictly applied. The methodology followed has two main stages of analysis and synthesis, complying with the regulations and leading to the proposal's final presentation at a scale of 1:25 000, after withdrawal of urban areas according to the Plan's Zoning map.

Analysis

At the first stage, various factors such as hydrography, topography, slope, geology, geomorphology, flood plains and land use were analyzed. Apart from these information layers, the National Agricultural Reserve of Esposende was also used as an input for the final proposal (Fig. 1).

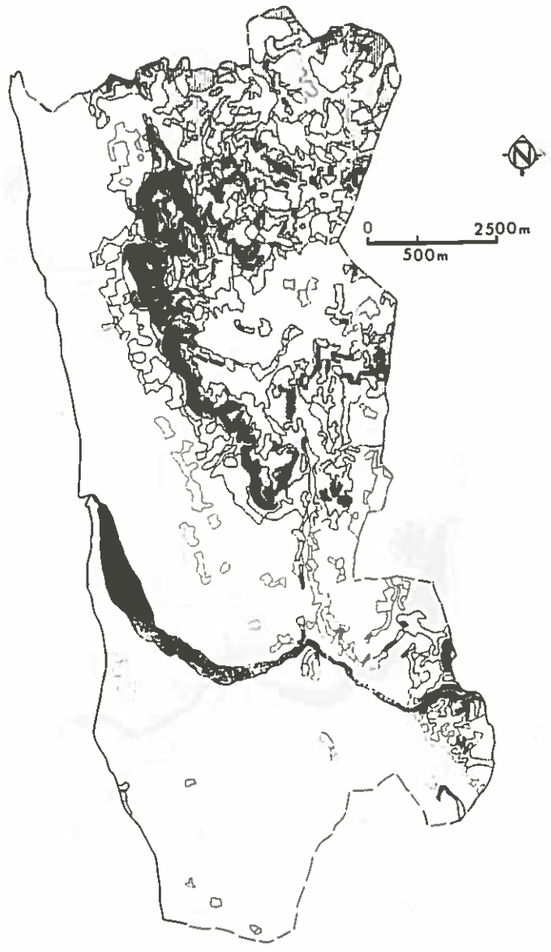

Fig. 3. Slope map. Dark areas represent areas of slope of over 30% and white areas those less than 6%. Dashed areas have an intermediate slope.

The River Cávado is the main watercourse crossing the municipality of Esposende. The river is 130 km long, approximately 10 km run through the municipality, with Esposende located by the river estuary, surrounded by a coastal and river landscape (Fig. 2). The River Neiva forms the northern boundary of the municipality. A major topographical feature, north of the River Cávado and at a distance of between 1.5 and 3.0 km from the seashore, is a rather high area of fossil cliffs with an average altitude of 200 m, separating the coastal plain from the inland region. The southern part of

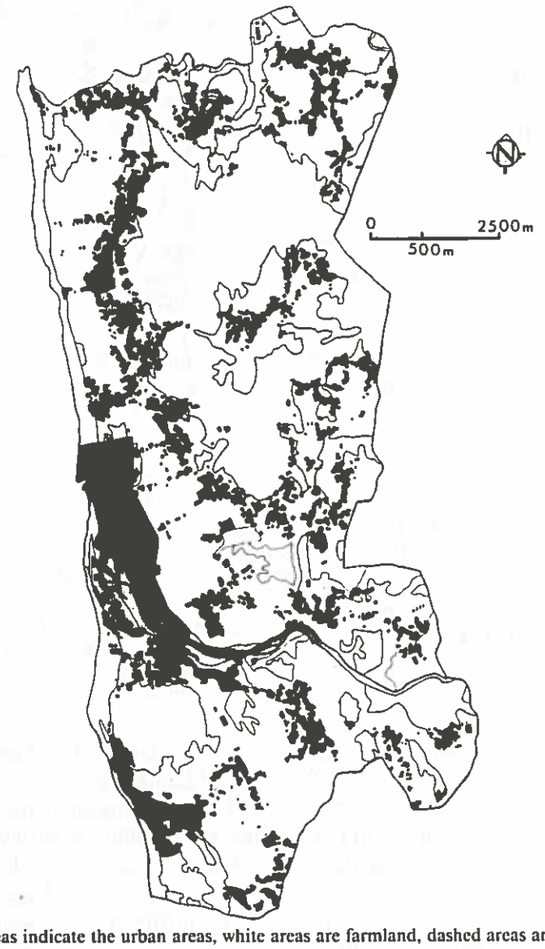

Fig. 4. Land use. Dark areas indicate the urban areas, white areas are farmland, dashed areas are forested lands and along the coast a strip of land consisting of sand dunes and beaches is indicated.

the municipality and the coastal plain are of a very soft topographical character with an average slope of less than 6%, contrasting with the over 30% slopes of the cliffs and the wide topographical diversity of the interior northern landscape (Fig. 3).

Geomorphologically, the coastal plain has a wide diversity of recent formations composed of wide beaches, dunes, alluvions, ancient coastline deposits parallel to the coast and river terraces along the banks of the River Cávado. The inland region is of an ancient formation composed of several areas of schists and granites, with a variety of contact surfaces contributing to a very specific hydrological behavior.

One of the main assets of Esposende is its suitability for agriculture, a long tradition contributing to a unique cultural ambience that combines ancestral sea-related activities with the rural life enhanced by the proximity to the Rivers Cávado and Neiva. Along the coast, agriculture is practiced on flat sandy soils organically enriched and providing high yields, mainly of horticultural products. Here, land use is pressured by vacation housing, especially along the coast for the Greater Oporto population. The alluvium along the river banks and other flat areas offer different agricultural landscapes, contributing to a lush diversity of scenarios dramatically enhanced by the fossil cliffs and punctuated by ancient pilgrimage shrines. The cliffs and other hilly areas are covered with forest, mainly pine trees and some remnants of deciduous forest (Fig. 4).

Synthesis and proposal

The delineation of the protection areas is derived from the decree of the National Ecological Reserve according to three homogeneous areas: (a) seashore, (b) river corridors and (c) steep slopes. It was achieved through a synthesis of the above information (Fig. 5).

(a) Seashore. In 1989, a strip of land along the coast, approximately 250 m wide except at the mouth of the River Cávado where it widens, was classified as Esposende Coastal Protected Landscape.

Fig. 5. The National Ecological Reserve of Esposende. The grid area represents the fossil cliffs, vertical lines represent areas of maximum infiltration, dots represent the sand dunes and the oblique lines represent flood areas.

The following elements were identified from the geomorphological layer: (1) beaches developing in a more or less straight line with several Paleozoic rocks at the seashore, particularly in the areas between the estuary of the River Neiva and the sea and between the estuary of the River Cávado and Apúlia; (2) coastline dunes, non-consolidated and located in the area behind the beach; (3) ancient dunes represented in a discontinuous shape throughout the coastline; (4) sandbanks located on the estuary of the River Cávado; (5) small immersed rocks on Esposende's coast, called the Horses of Fão.

The cliff, identified from geomorphological, topographical and slope layers, is defined in the legislation as "a particular shape of abrupt or slope coast, generally carved in coherent rocks by the combined action of continental and biological sea morphogenetic agents".

(b) River corridors. This category includes water courses and areas adjacent to the Rivers Cávado and Neiva which are threatened by floods derived from the flood course layer. The maximum infiltration areas were derived from the National Agriculture Reserve, slope and geological layers according to the co-occurrence of the following classes: protected agricultural lands, alluvium, slopes less than 6% and ancient beaches and river bank terraces.

(c) Steep slopes. Once the significant steep slopes in Esposende coincide with the cliff, under this category no areas were delineated.

These areas are Esposende's contribution to the National Ecological Reserve and are located in the areas of the greatest local ecological interest. The aim of zoning regulations for such protection areas is to apply restrictions and mitigation measures and simultaneously open compatible development opportunities within the Town Master Plan's overall proposal. Areas submitted to the National Ecological Reserve regime must comply with the following:

> "it is forbidden to carry out private or public actions such as allotments, construction works, buildings, hydraulic works, roads, embankments, excavations and destruction of land cover" (Decreto-Lei, 93/90).

Each class and sub-class was detailed within the zoning regulations, focusing on land-use restriction and compatibility of other uses, mostly recreation and conservation oriented.

Figure 5 does not show the exact final proposal, as this has to be reconciled with the Zoning map of the Master Plan. This map includes the urban development areas (dark areas in Fig. 4) that have to be subtracted from the National Ecological Proposal. In order for the proposal to become part of the Master Plan through the Restrictions map, it has to be reconciled with the areas included in the National Agriculture Reserve and the Esposende Coastal Protected Landscape.

FUTURE OPPORTUNITIES

Once the National Ecological Reserve is approved, the municipalities follow an operational legal procedure enabling them to coherently restrict uses in the areas where environmental impacts are expected. Esposende is a paradigmatic case study of the problems experienced in Portugal. The scarcity of resources has attracted the population to the coast and river corridors where one finds the largest ecological diversity, and fragility. The confrontation with development pressure creates a challenge to convey the idea of nature conservation as an opportunity for development and the rise of life quality.

At the national level, a revision of the current Law of Local Finances seems to be a worthwhile undertaking. In addition to local income from taxes on property, cars, fire services, tourism and other minor sources, the municipalities have access to the Financing Equilibrium Fund, derived directly from the Government. The criteria for distribution of the money depend upon the number of inhabitants, area, road system, plus an index of socio-economic development that is based on industry, agriculture, deficiency in infrastructures and accessibility. Because these criteria do not encompass any factor sensitive to the landscape and to the uniqueness of the area, then they clearly miss what Relph and Helm (1991) defined as "the attitude of environ-

mental humility" which takes issue with "this technical and manipulative approach to places and turns towards an understanding by all the senses of the individual realities of places". How are the present legal instruments in Portugal acknowledging the individuality and the ecological balance of the landscape?

A possibility is the introduction into the Financing Equilibrium Fund of an index based on the area of National Ecological Reserve which could be an incentive to the municipalities to protect nature and their cultural heritage, and create related jobs. The development now occurring in Portugal is inevitable and not fully compatible with the practice of sensitive landscape planning based on the integration of ecological principles and economic development. Though this situation reduces the chances of the creation of a post-modern attitude towards the Portuguese landscape, the existing legal framework holds potential for the implementation of such strategies.

Esposende is about to experience the construction of a new major road, as an alternative to the one running parallel to the coast. The new road still runs parallel to the coast but more towards the east. It crosses large areas of the proposed National Ecological Reserve, namely the flood plain and the fossil cliffs. Compensation for the impact of the road upon the ecological reserve can be quantified based on the extent of the loss and implemented through an investment in projects to minimize the impact of the road and to mitigate other existing impacts on ecologically sensitive areas.

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