

## **Connectivity within the Andalusian Network of Natural Protected Areas**

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### **Introduction**

The unremitting rate of transformation undergone by nature over the last two centuries has brought about a widespread deterioration of the ecosystems, creating, as a result, scattered fragments of natural areas. Such a degradation of the natural environment has given rise to a fragmentation of the territory, reducing, in many cases, natural areas into the condition of mere islands surrounded by large areas devoted to anthropic uses.

These facts have fostered a social and institutional concern with regard to the preservation of areas of importance from the standpoint of biodiversity, but also from cultural or ethnological points of view. By way of response to these demands, the need is generated to protect these areas by means of specific sets of rules and regulations that may prevent the deterioration of their values and, even, help them to recover from the loss sustained.

A period of time having elapsed in which the adequate protection of a percentage of territory has been successfully achieved - not quite enough, but an important one nevertheless - the fact is established, within a general scope, that the evolution of the protected areas and that of the territories surrounding them is completely different, their respective states of conservation growing increasingly apart, and giving rise, accordingly, to a greater degree of isolation of the natural areas and, as a result, an increased risk of impoverishment of the values because of which they were protected in the first place.

Within this context, it is basic to achieve the physical, administrative and socio-economic interconnection of the different elements making up the systems of

protected areas at the different territorial scales: regional, national and international.

In the case of the Self - Governing Region of Andalusia, work is being carried out for the purpose of consolidating the regional network of protected areas, and on the factors that facilitate the interconnection of each one of them. We shall be analysing these factors and elements which complete the network and enhance their biodiversity values.

For the Andalusian network we have created the motto: *RENPA. Linking Nature and Society Together.*

### **Establishment and consolidation of the Andalusian Network of Natural Protected Areas (RENPA)**

Thanks to the approval of the Inventory of Andalusian natural areas in 1989, it was possible to achieve the opening of the consolidation process of a wide administrative network of natural areas, as a continuation of the process set in motion in 1982, when the responsibility for matters pertaining to nature conservation was transferred to the Andalusian regional government. The said inventory was based on preliminary studies which regulated the Andalusian territory and protected the physical milieu on the basis, in the main, of land law. In the following years planning tools intended for these areas were approved (the Natural Resources Regulation Plans), as well as management tools (the Use and Management Guiding Plans), and other use and exploitation sectorial plans, such as the Public Use Programmes.

Nowadays there has been an evolution from the initial approach aiming at the particularized regulation and management of each protected area, towards the unitary coordination and management of the whole, for which purpose the RENPA Guiding Plan was established, a framework document for the conjunction of the different actions which are carried out throughout the network, and whose purpose is that of achieving functionality in the Andalusian protected area network not only from an administrative standpoint but also from an ecological point of view.

Over the last twenty years, the Andalusian Network of Natural Protected Areas has evolved and grown to the point of constituting a dense network covering

more than 1,600,000 Ha - 18% of the Andalusian territory - and including 127 natural areas under different protection figures.

Nowadays RENPA is configured not only as a conservation - oriented tool but also as a development opportunity. What its management aims at is the integration of natural protected areas into the territorial matrix, by taking the ecological, physical, administrative and socio - economic links into consideration, clustering and making compatible aspects such as:

- Conservation of biological, ecological and geological diversity.
- Social and economical development.
- Traditional productive activities.
- Environmental quality.
- Environmental education, public use and the social volunteer movement.
- Popular customs and cultural heritage.
- Territorial planning.

### **RENPA's Guiding Plan. Towards a systematic management of the protected territory in Andalusia**

The RENPA's Guiding Plan (GP) is a framework document in which the guiding principles and management criteria are laid down, as are the operational programmes and the necessary procedures, to achieve coexistence between the maintenance of the ecological integrity of the Andalusian protected ecosystems and the sustainable use of the numerous goods and services that the functions thereof provide society with.

Its conception has been based on the leading principles put forward by the IV World Park Congress (Caracas, 1992), and on those stemming from the document *Parks for Life: Action Plan for Europe's Protected Areas* (IUCN, 1994) and from *Action Plan for Spain's Natural Protected Areas* (Europarc-España, 2002). From a conceptual standpoint the plan's foundations are to be found in the discipline of system ecology and in that of landscape ecology, proposing a model of management - which goes beyond the boundaries of the protected areas - based on the knowledge of the key ecological processes determining the way natural protected, or protectable, areas operate.

The list of its goals includes, among others, :

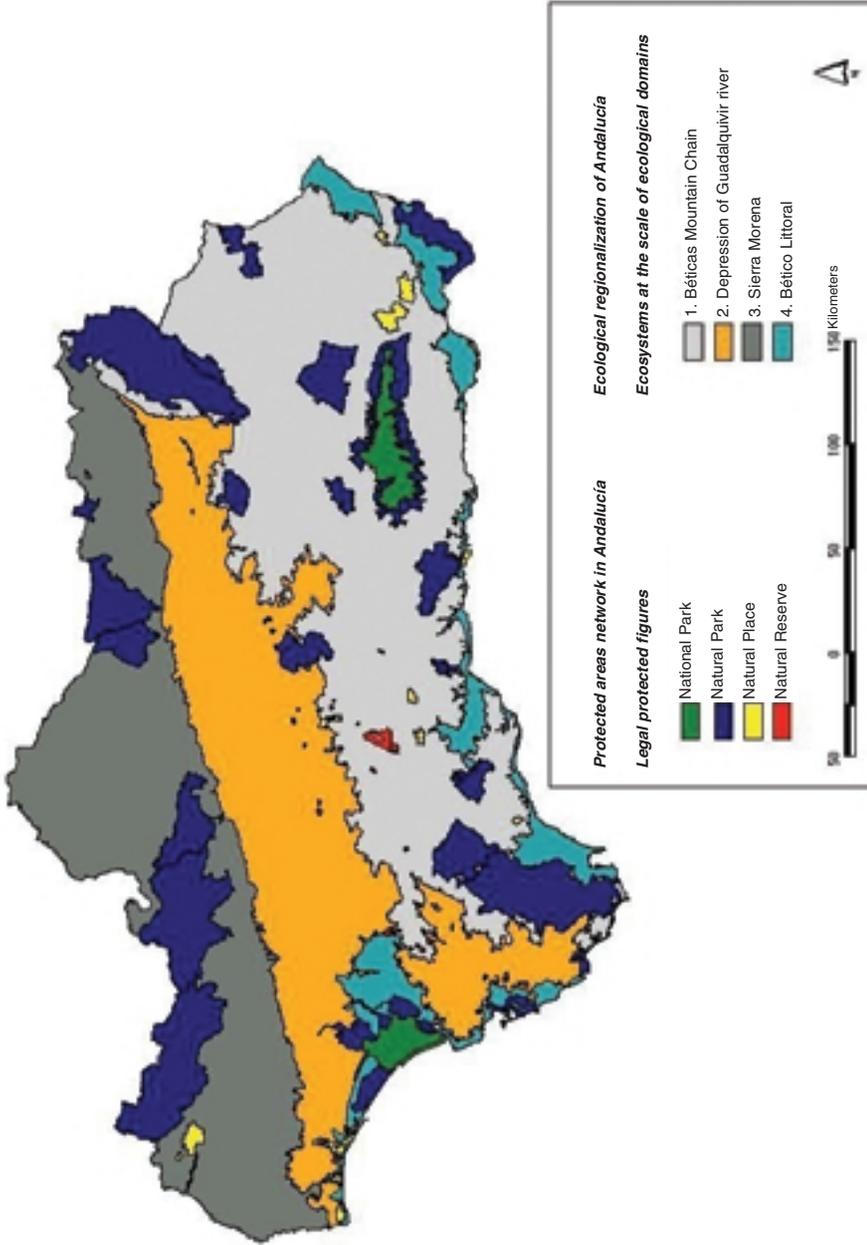
- Making a contribution towards the creation of a functional network of protected and non protected areas linked by means of ecological and cultural corridors or other elements increasing the territory's ecological permeability.
- Providing other policies with an environmental component, by integrating conservation goals into other policies having a territorial impact on the territory.
- Providing protected areas with a territorial meaning, by integrating them into territorial planning.

For these objectives to be achieved the ecological regionalization of Andalusia is being used as a tool, for the purpose of establishing functional management units that make it possible to delimit the area of influence of natural protected areas beyond their administrative boundaries.

The GP is in keeping with the Andalusian Environment Plan, and coordinates the different action policies having an effect on the RENPA. It is developed by means of Sectorial Programmes which are put into effect in each one of its elements or natural areas, as well as in their territorial links.

From these Sectorial Programmes the following stand out:

- The Andalusian Wetland Plan (PAH), whose operational goal is that of protecting and preserving the ecological integrity of the wetlands, as well as trying to restore it in all those cases in which it has been degraded or destroyed. It acknowledges, on the one hand, that the contribution made by biodiversity towards the operation of the wetlands not only derives from the number of species living in them, but also from the ecological role played by each one of them; and, on the other hand, the need to directly and indirectly manage these ecosystems at different spatial and temporal scales. From the management standpoint, the PAH envisages three basic levels of reference: the network and the assemblage of marshes, the wetlands together with its superficial or subterranean basin and the lesser - rank ecosystems within the wetland - grassland of macrophytes, sandy bottoms, halophyte belt - (Consejería de Medio Ambiente, 2002).



**Figure 1.** Proposal for the ecological regionalization of Andalusia at the scale of ecological domains within the framework of the GP. Four ecological domains have been identified, which, in turn, are subdivided into fourteen ecological provinces.

- The Action Plan for the Andalusian Marine Protected Areas, based on the recognition of the spatial heterogeneity of the marine habitats and on the need to globally preserve the structure and functionality of the ecosystems.

### **Connectivity within RENPA**

It is necessary to bear in mind that the catalogue of natural areas that RENPA is made up of has not been configured by taking as a starting point an orderly process aimed at the establishment of a network. Even though different reviews, inventories, plans and programmes have been carried out which have gradually delimited and defined the areas which would subsequently be declared natural areas by using the concepts nowadays known to us, from a geographical and ecological point of view those areas are not all the ones that should be included. And those being included, do lack a coherent delimitation from a territorial standpoint. The origin of it all is a series of historical features and limitations, which have resulted in the current extension of protected areas.

There are several factors and processes which have, and which are going to have, an influence on the final consolidation of RENPA as an ecological network, in addition to being an administrative one. Among them, the following deserve to be mentioned:

- *Consolidation of the Natura 2000 Network through the declaration of Special Protection Areas (SPA) and Special Protection Areas for Birds.*

The introduction of the Natura 2000 Network and its implementation in the Self - Governing Region, shall entail the protection of more than 2,5 million hectares. The Natura 2000 Network will complement the current map of natural protected areas. It will act as a set of spatial links between large areas of the Andalusian geography and will facilitate the connection of a large number of already protected natural areas. For that purpose, it is necessary to guarantee management models which are suitable, balanced and coherent with the cultural, social and economic reality existing in places where such areas are going to be declared.

The future of these areas and their conservation entails the awareness, the acceptance and the active participation of the local communities inhabiting them.

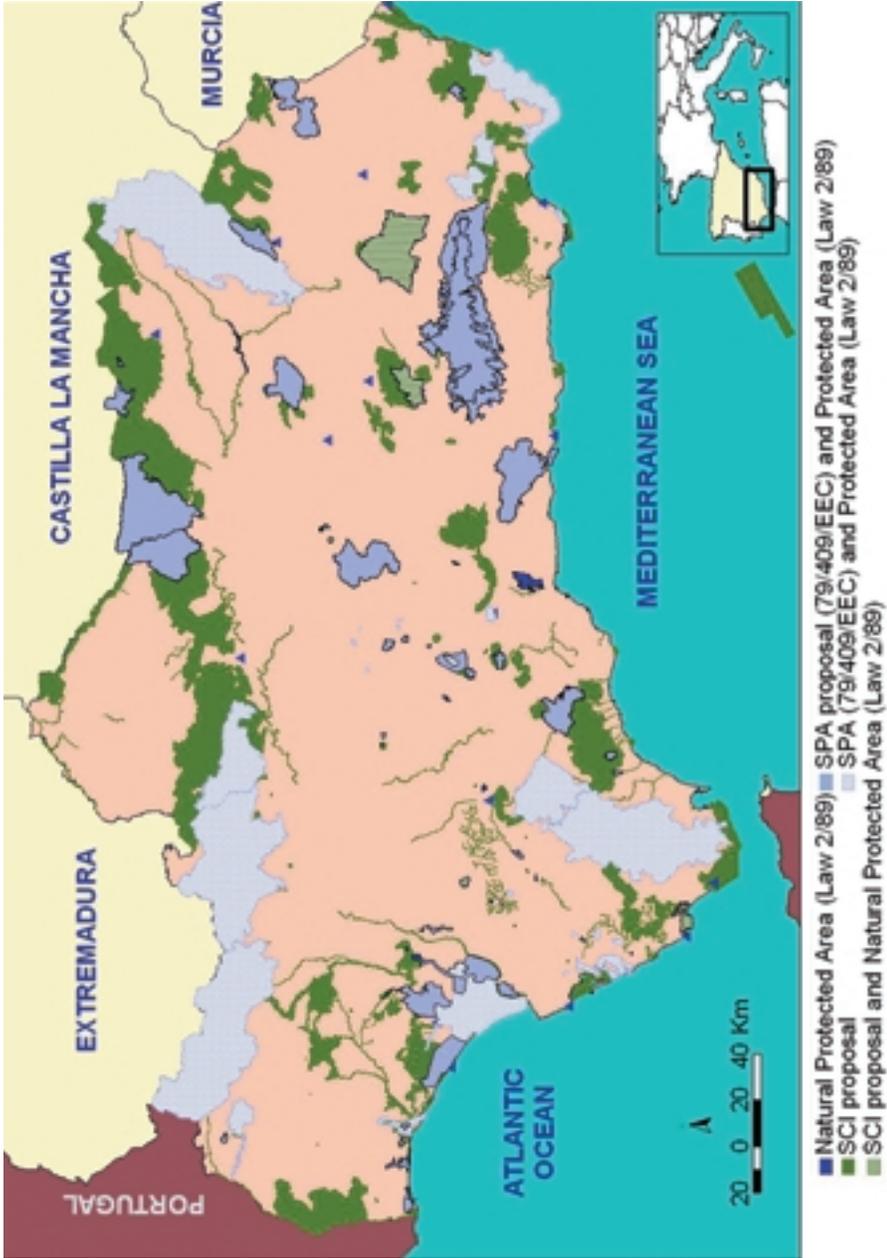
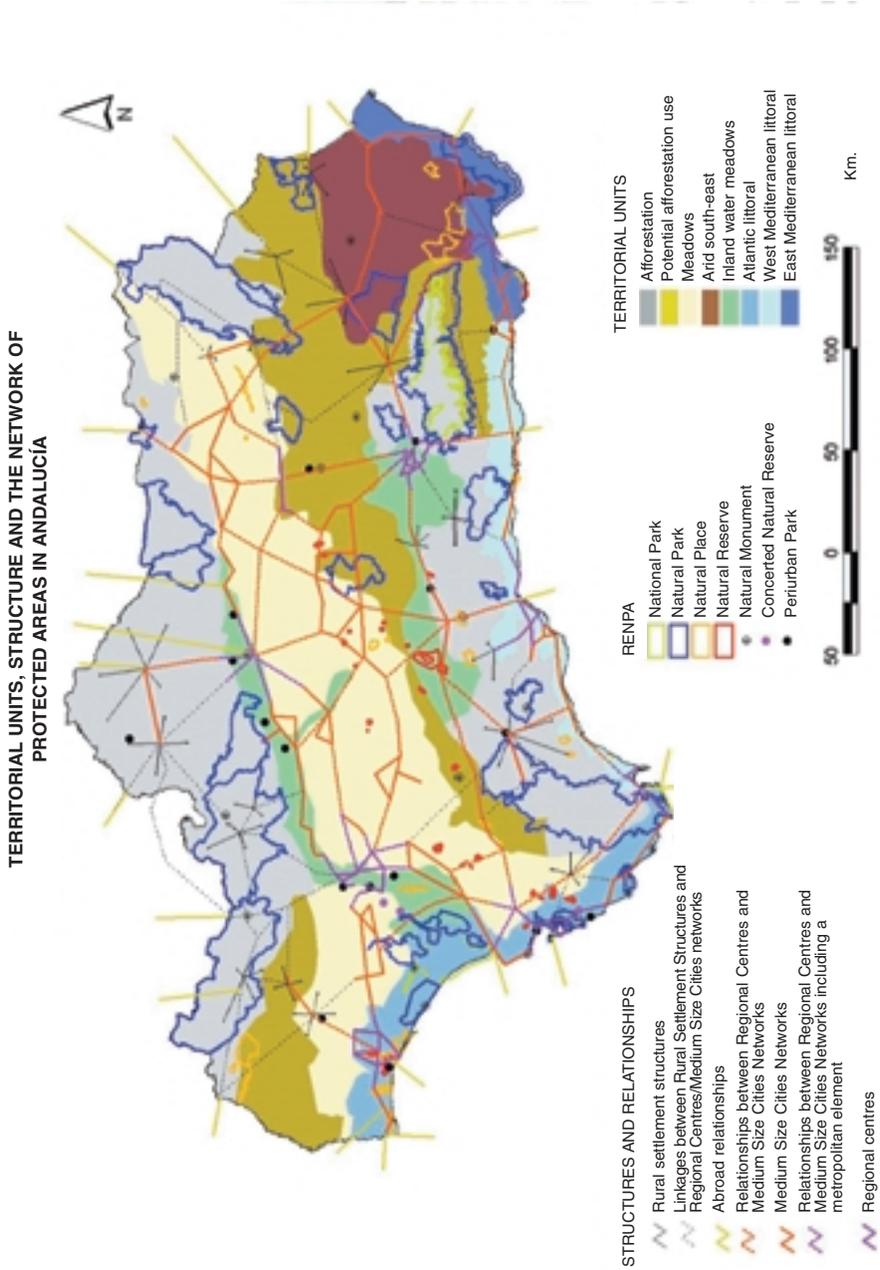


Figure 2. Superposition of RENPA areas upon the areas put forward by Natura 2000



**Figure 3.** Superposition of the Andalusian Territorial Regulation Plan upon the Andalusian Network of Protected Areas

It is also important to analyse the boundary effects existing between these areas and the already declared natural areas. In the latter, a planning and regulation of their natural resources is already in place, and a more restrictive set of rules and regulations has been enforced for some time.

- *Consolidation of the regionalization of Andalusian natural areas and their area operation, by integrating RENPA into the territorial systems.*

For the purpose of providing the network's natural areas with coherence, it is necessary to take account of the integration thereof into the territorial regulation strategies and plans, as well as of their adaptation to the ecological regions existing within the territory.

In such a context, the interrelation between RENPA's Guiding Plan and the Andalusian Territorial Regulation Plan, is one of the most relevant tools to the guaranteeing of territorial connectivity and to the facilitation of the settlement of conflicts deriving from the development of infrastructures in Andalusia.

- *Restoration of rivers and river banks as active and functional ecological corridors, acting as links between natural areas at the different territorial scales.*

The Andalusian river network is not precisely characterised by having very large or very long courses, but there is wealth of small rivers, streams, brooks, rivulets, tributaries or dry riverbeds, characterizing this territory and which are vital elements for connecting natural areas, sheltering different species and acting as basic corridors for the dispersal of their specimens, in addition to being an important part of the Andalusian landscape.

The recovery and the integration of these riverine elements, their banks and their accompanying vegetation, their gallery forests, as envisaged in the Andalusian Plan for the Restoration of Rivers and River Banks, will be one of the essential steps towards guaranteeing the connectivity we hope to achieve. The Guadiamar Green Corridor (Arenas, this volume) is a clear example of how the ecological restoration of rivers and river banks is an important environmental connectivity option in Andalusia.

Other aspects, of no lesser importance than the previous ones for the consolidation of an ecologically functional network of protected areas in Andalusia, are the following:

- *Recuperation and/or adaptation of those elements of the Andalusian Cattle Way Network being potentially functional as ecological and cultural corridors (Múgica et al., 2002).*
- *Establishment of the concept of ecological corridor as an administrative form of territorial management, enabling a more suitable administration and management of these natural areas.*
- *Identification and conservation of natural elements remaining in the agricultural landscape, as an important connectivity option in Andalusia.* Nowadays this approach has been put into effect in the province of Cadiz, where an inventory has been made of the island forests in the Cadiz countryside (Aparicio et al., 2001), and in which the conservation and the management thereof is being jointly carried out by the environmental administration and the owners of the farms.
- *Strengthening of concepts being regional in scope and sustainable development of international programmes, such as the MaB, in conjunction with the Biosphere Reserves.*

### **Analysis of critical areas and relevant spots for RENPA connectivity**

To deal with the analysis of connectivity in Andalusia the following has been taken into consideration:

- *The critical areas*, contact zones between protected areas, whose management and administration depends on different direction centres or different official bodies.
- *The relevant spots*, zones within the territory which are basic to guarantee connectivity between the RENPA elements.
- *The territorial boundaries* of the Self - Governing Region with other Spanish regions and with Portugal.

Some of the most relevant examples bringing to the fore the deficiency in the connection with other areas and the different models that could be established to achieve effectiveness are listed below:

### *Sierra Morena transversal corridor*

This cultural and ecological corridor is an immediate consequence of the spatial unbrokenness of protected areas in the northern sector of Andalusia (Figure 2). In the NW quadrant, spatial connectivity is determined by the existence of a large protected area, divided into three areas - natural parks - differentiated according to administrative territorial criteria. The recent declaration by UNESCO of these three parks as one single area, pursuant to the concept of Biosphere Reserve, does contribute towards the permeabilization of administrative boundaries to the environmental and cultural needs of this territory. On the other hand, in the NE quadrant, the Natura 2000 area proposal is a fundamental tool for territorial connectivity, promoting the connection of RENPA protected areas within this sector.

This will undoubtedly be the largest ecological and cultural corridor of the Iberian Peninsula, but for it to become a reality it is necessary to correct, among others, the effects brought about in the critical areas through the coordination of the different levels of government, as well as that of the different Direction Centres of the Regional Department of the Environment involved in the management of the protected and protectable territories when the Natura 2000 Network comes into effect. In this regard, the recent declaration - previously mentioned - of a Biosphere Reserve provides a chance to eliminate critical areas in the western sector of Sierra Morena, for this concept, included in the UNESCO MaB Programme, envisages among its objectives the comprehensive management of the territory. On the other hand, it is necessary to devise and to implement in the LIC's adequate and efficient management plans from an ecological, cultural and socio - economic point of view and to integrate the conservation and the management of these areas into the framework of the RENPA Guiding Plan, as well as to foster the conservation of such *relevant spots* as exist in this sector of Andalusia. Likewise, it is necessary to establish joint action programmes with the bordering Self - Governing Regions and with Portugal to achieve a single vision of Sierra Morena as a whole.

### *South - eastern natural areas*

A large number of natural areas, including a wide variety of ecosystems - under different protection categories - are located in the south - eastern sector of Andalusia. This sector encompasses from the underwater ecosystems of posidonia

meadows and volcanic areas of the Cape of Gata, to the high summits of Sierra Nevada, the highest point in the Iberian Peninsula, to the only deserts or sub-deserts in the European continent. The establishment of links between these protected areas would make it possible to make progress in the consolidation of a system of protected areas in Andalusia envisioning the inland, coastal and marine regions as constituent elements of one single conservation system, and not as three separate subsystems.

### *Natural areas in the Subbética region - straits of Gibraltar*

They make up a set of physically - connected natural areas belonging to the provinces of Cádiz and Málaga. The majority of these areas are included in the same physiographical unit, which is why the management within the framework of the GP of the critical areas and relevant spots in this sector will strengthen and consolidate this large unit from a conservational standpoint, as well as the connection between the inland and coastal ecosystems of the provinces of Málaga and Cádiz.

### *Southern - Atlantic littoral corridor*

The littoral areas of the southern coast of the Iberian Peninsula by the Atlantic Ocean included in the Gulf of Cadiz (the Portuguese region of Algarve and the coastal strip of the province of Huelva and, partially, of the province of Cádiz), have a large number of common geomorphological, sedimentological, lithological, hydrodynamic, ecological and socio-economic and cultural features. The greatest part of the coast is catalogued under some protection figure, in the Portuguese sector as well as in the Spanish one. Connectivity in these coastal areas is guaranteed by the drift currents that connect all this sector, although the development of harbour infrastructures, breakwaters and dense and high housing developments, too close to the coast, has modified the coastal dynamics, altering the dynamic balance of the associated sedimentary ecosystems. In the littoral strip, the strengthening of connectivity has arisen within the LIC's proposal put forward by the self-governing region, as well as through the management, with connectivity-related objectives, of publicly-owned woodlands lying between protected areas. Nowadays, there are several projects aiming at consolidating this coastal area as one single conservation unit.

### *Guadiamar Green Corridor*

As a connection element between the *Sierra Morena transversal corridor* and the *Southern - Atlantic littoral corridor* (see Arenas, in this volume).

### **The management of administrative connectivity within RENPA**

To achieve an ecologically and culturally functional interconnection between the elements of RENPA it is equally important to administratively co - ordinate the different actions affecting the Network. Such co - ordination is fundamentally based on the following aspects:

- Unitary management of the Network and correction of existing deficiencies concerning information, funding, services, equipment and actions.
- Settlement of conflicts in the critical - contact areas between natural areas and their boundaries, as well as their interrelation with future LICs.
- Enhancement of citizen participation in the process of management and administration of the areas, by providing their representative bodies with legal cover.
- Consolidation of the achievements attained in the different areas and application thereof to the rest of the network.
- Co - ordination of the efforts of the different direction centres involved in RENPA, both inside and outside the scope of the relevant Governmental Department.
- Fostering of the sustainable development models in the Network as a whole in order to improve the quality of life of local populations.
- Eco - regional management of the Network, thus achieving the saving of resources and the improvement of services rendered to the citizenry.

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