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Strawberry cultivation and Nature in Doñana

*Ecological Corridors
WWF/Adena's proposal*



May 2007

Strawberry cultivation and nature in Doñana: Ecological Corridors. WWF/Adena's proposal.

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STRAWBERRY CULTIVATION AND NATURE IN DOÑANA: ECOLOGICAL CORRIDORS. WWF/ADENA'S PROPOSAL

TABLE OF CONTENTS

1 Introduction	4
2 Strawberry cultivation in Doñana	4
2.1. Soil use.....	5
2.2. Water use.....	6
3 Proposal for a solution: corridors and land use planning	8
3.1. Ecological corridors.....	8
3.2. Ecological values provided by corridors.....	10
3.3. The procedure proposed by WWF/Adena.....	11
3.3.1. <i>Restoration of the corridors</i>	11
3.3.2. <i>Land use planning</i>	12

1. Introduction

WWF/Adena has deeply analysed the strawberry cultivation in Doñana, as well as its environmental effects, being aware of the problems it involves for the nature from the 80's, but also taking into account the economic importance this cultivation represents for the *Area*.

Through this publication, WWF/Adena is presenting a public proposal of ecological corridors for the strawberry fields area in the Northwest of Doñana, allowing the recovery of natural corridors which were connecting Protected Areas with other internal natural values, not so long ago.

Prior to this public presentation, WWF/Adena has transferred and discussed about this proposal of corridors with officials of the Agriculture and Environmental Regional Authorities and the Guadalquivir River Basin Authority, as well as with some other representatives of local communities, farmers and ecologists, achieving a good general acceptance.

WWF/Adena considers that the current situation represents a suitable opportunity to make the proposal of ecological corridors a reality, particularly, if we take into account the new Sustainable Development Plan for Doñana and the strong participating procedure associated to it. The local and regional administrations have now the responsibility for promoting this initiative and helping to the coexistence between the strawberry cultivation and the conservation of the nature in Doñana.

2. The strawberry cultivation in Doñana

The strawberry represents one of the main cultivations in Doñana, as regards the area it covers and its effects on the environment. With almost 6.000 hectares of crops, this area produces the most important part of the strawberry in Huelva, and around 60% of the strawberry in Spain.



Example of a strawberry plant

By the same way, the production of strawberry is having an alarming impact on the quality and the quantity of available water for the wetlands systems of the National Park, and on the connection of Doñana with the other internal natural values.

2.1. Soil use

Since the introduction of the strawberry cultivation in Doñana, the occupation of the woodland after the pine forests being cut without the requested licenses, is a well known fact in a lot of public cases.

WWF/Adena has analysed the occupation of the protected areas following the Habitats Directive, the Forest and Water Laws for intensive irrigation, and specially the strawberry, in the area of the headwater of the Rocina and Estero de Domingo Rubio creeks (Almonte, Bonares, Lucena del Puerto, Moguer, Palos de la Frontera and the Rociana del Condado municipalities), using the POTAD¹ cartography: 449.73 hectares of irrigation are located inside the protected areas of the Natura 2000 Network, some of them also take part of the Protected Natural Areas of Andalusia Network (RENPA) and, 2,173 hectares have occupied Public Forest.

Besides, around 35% of the length of the creeks in the area, are occupied or very damaged by the agricultural activities.

Occupation by irrigation in the protected areas		
		Municipality
Natura 2000 Network		
Estero de Domingo Rubio	4,48 ha	Palos de la Frontera
Laguna de Palos y las Madres	278,88 ha	Palos de la Fra. y Moguer Palos de la Fra. Moguer
Dehesa del Estero y Montes de Moguer	100,13 ha	Moguer
Doñana Norte y Oeste	66,24 has	Almonte
TOTAL	449,73 has	
Public Forest in Huelva		
HU-50.001	219,63 ha	Moguer
HU-50.007	947,56 ha	Lucena del Puerto
HU-50.017	56,34 ha	Bonares
HU-51.003	950 ha	Almonte
TOTAL	2.173,53 ha	

Source: WWF/Adena, based on the Junta de Andalusia cartography, 2003

Occupation of creeks by irrigation			
	Creeks total length	Occupied length	% Occupied
Cañada Area- conexión Tinto River ²	45,74 km	9,47 km	20,70 %
Head of the Rocina Stream- Connexion with Tinto River ³	20,21 km	6,48 km	32,10 %
Estero Domingo Rubio and Las Madres River Basin – Conexión with Tinto River ⁴	42,95 km	20,18 km	46,98 %
TOTAL	108,9 km	36,13 km	33,18 %

Source: WWF/Adena, based on the Junta de Andalusia cartography, 2003

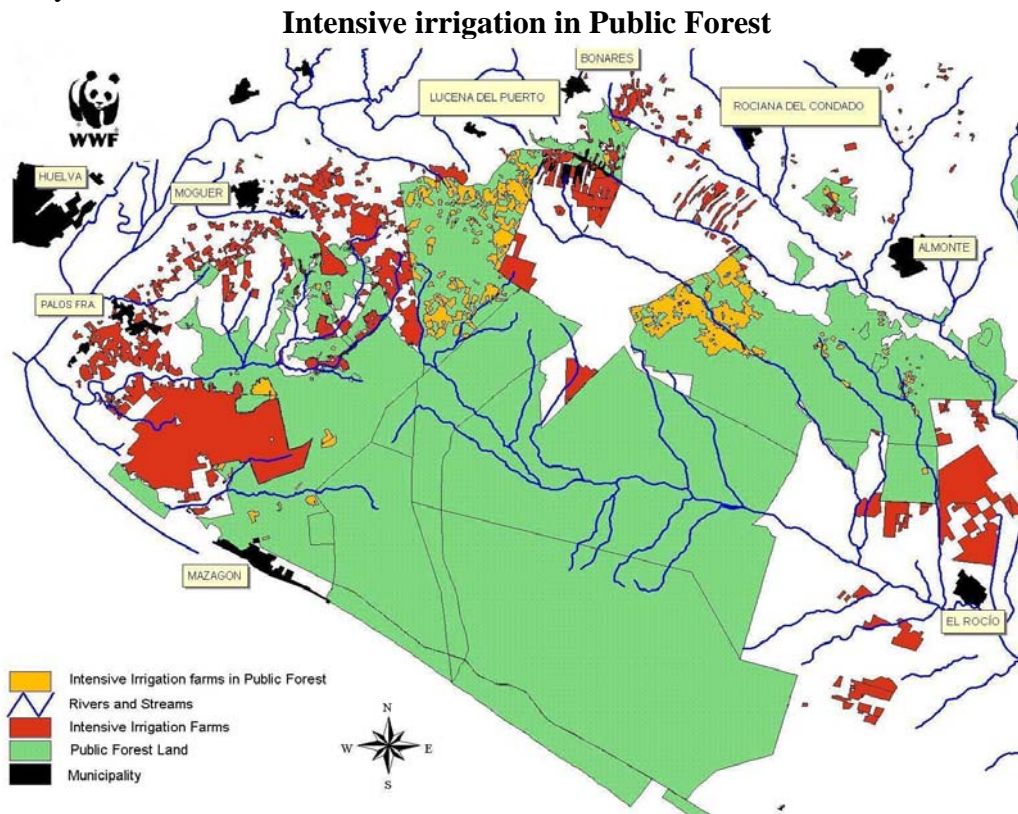
¹ Plan de Ordenación del Territorio del Ámbito de Doñana. Junta de Andalucía, 2003.

² Streams studied: La Cañada, Las Vaquerizas, Avispero, Moriano y Fresno

³ Streams studied: Las Empedradas, Gago, Mojón Blanco y Laguna del Rayo

⁴ Streams studied: Estero Domingo Rubio, Dehesa del Estero, Grulla, Peral, Monas, Angorillas y Previza

Whether with legal or illegal fields, the a land use planning of irrigated crops in Doñana does practically not exist. This led to a situation of an irrigation/forest mosaic which is not profitable neither for the farmer nor for the nature. The scattered cultivations make difficult, and very expensive, to provide all the fields with the required services like the light or the asphalted ways. This converts some of the areas into labyrinths of electrical installations and faster tracks without any kind of sense, and which do not satisfy anybody.



Source: WWF/Adena, based on the Junta de Andalusia cartography, 2003

Regarding the nature, the strawberry fields distribution and the infraestructure associated to it, have led to the fragmentation of the habitats which are surrounding the protected areas. As the natural corridors are being cut out, the terrestrial fauna is moving through to go in and out of the Park. Currently, these impacts are threatening the conservation of the most endangered species and the upkeep of the biodiversity of Doñana, in the long term.

2.2. Water use

In Doñana, the illegal water used for the strawberry cultivation reaches 50%⁵ of the fields: in some of the cases, there is no license for the water abstraction, and in some other cases, the license is under procedure but still not obtained, and in most of the cases, the abstracted quantity of water from the wells exceeds the allowed ones or those which could be permitted.

⁵ Analysis of the ground water abstraction in the headwater of the basin of La Rocina creek, Guadalquivir River Basin Authority, 2004.

As a consequence of the ground water abstraction, the Doñana aquifer is overexploited in several areas. From a hydro-geological point of view, the Guadalquivir River Basin Authority (CHG) has detected an alarming ground water depletion of the aquifer in the South of Villamanrique, around El Rocío and La Rocina. From an ecological point of view, the aquifer overexploitation becomes obvious with the disappearance of temporary lagoons and the loss of vegetation which requires a higher humidity of the soil (riverine forests, cork oaks, *monte negro*...).

During the last 30 years, La Rocina creek which is still one of the main water supplier for the marsh during the summer, has suffered a water depletion in 50% of the aquifer. Therefore, this has modified its riverside wood, and the sandy areas as well as the giant reeds of its banks have been replaced and covered by ashes which are characteristic of drier soils. It has also modified the light conditions and the temperature of the riverbed which have altered the species habitats such as the linnet (*Rutilus lemmingii*) or the Iberian chub (*Leuciscus pyrenaicus*), two threatened fish species.



Situation of La Rocina creek, near the Puente de la Canaleja, Autumn 2005



Occupation of the La Grulla creek

Besides, cultivations⁶ are excessively irrigated and, in most of the cases, 40% more than the quantity really needed is wasted. This excess of irrigation causes a loss of water because of the percolation or the wash out through the sandy areas, apart from the contamination of the ground waters due to the fertilizers which are added to the irrigation water, especially nitrates.

⁶ “El cultivo del fresón en el ámbito de Doñana”, WWF/Adena’s report, 2004

3. Solution proposal : corridors and land use planning

Further to the alarming situation of the pine forest land in the Northwest of Doñana, and the isolation risk the Protected Natural Areas are running, WWF/Adena proposes several ecological corridors in order to guarantee the connection of these areas with the other internal natural values.

WWF/Adena considers this proposal as the basic procedure to be applied in the short term, and which has to be associated to a land use planning for Doñana.

Apart from the creation of corridors and the land use management, measures should be taken to achieve a more efficient water use and to eradicate the contamination of waters and soils by the pesticides or fertilizers. This hard task requires a change of attitude from the farmers and a commitment by the Public Administration and the markets to support this change. This will be the only way so as to make agriculture and nature compatible in such a special area.

3.1. Ecological corridors

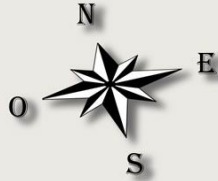
WWF/Adena's proposal of ecological corridors will connect Doñana with the Tinto River and the Candon Stream, through the forest area and the agriculture in the Northwest of the Natural and National Parks, being supported by creeks and Public Forest Land, through three corridors:

La Rocina Corridor: composed by the Don Gil, Mojón Blanco, the Empedrada, El Gago and La Cierva creek, to be connected with the Laguna del Rayo creek, the Candon Stream and the Tinto River. It represents a surface of around 3,100 hectares, from which 390 are currently occupied by intensive irrigated cultivations.

La Cañada-Vaquerizas Corridor: which includes the Avispero and the Moriana creeks, meant to be connected with the Hondo, the Fresno, the Horcajo creek, the Laguna del Rayo, Candón and the Tinto River. It covers more than 6,200 hectares, from which 340 are occupied by intensive irrigated cultivations.

Estero de Domingo Rubio Corridor: based on the Angorillas creek, the Monas, the Peral-Previza and the Grulla, and linked to las Madres del Aviator. This corridor will connect with the Laguna del Rayo creek, the Candón and the Tinto River. This corridor covers a surface of 9,900 hectares, from which 733 correspond to intensive cultivation.

The demarcation of the corridors carried out by WWF/Adena has been focused on the Rivers of the Guadalquivir Basin as this is the area where more conflicts may arise. Whereas the Tinto River affluents mostly run through unirrigated areas and through some quite well conserved tracks, the creeks corresponding to the La Rocina basin, and the Estero de Domingo Rubio, run between strawberry crops and other intensive cultivations which are in a lot of cases, facing an irregular situation, not only because of the water use but also because of the soil occupation used for agriculture purposes in Public Forest Land or Hydraulic Public Territory (DPH).



-  Corredores Ecológicos
-  Corredores Fluviales
-  Corredores Forestales
-  Espacios Protegidos
-  Red Natura 2000
-  Monte Público
-  Cultivos de Fresas
-  Ríos y Arroyos
-  Carreteras /Autovías

WWF/Adena's proposal of Ecological Corridors

3.2. The ecological benefits provided by the corridors

An ecological corridor is a natural greenway between two valuable areas, which allow the fauna and the vegetation of these areas to be linked and not isolated. Besides, an ecological corridor has to make sure that the ecosystems it pretends to link and it occupies, are recovering their ecological functions and conserving their landscape values.

The ecological corridors proposed by WWF/Adena will recover the physical connection existing between Doñana and the Tinto River and the Candon Stream, which represents a natural way of dispersion for the fauna to and from the Sierra Morena. At the same time, they will allow the woodland and the creeks of the area to get back their functionality. By this way, it will profit the environmental services given by the nature, such as the erosion control, the climate regulation, the aquifer infiltration, and also the creeks recover during the summer with water coming from the aquifer itself, to keep up the marshes during the hardest and driest months of the year.



Protected area of the La Rocina in the Moguer track



Dehesa de Vaquerizas (agropastoral system)

Referring to the fauna, apart from the fishes or other species who live in the creeks waters, the medium size mammals like the mongoose, the otter or the lynx will be highly benefited. For the Iberian lynx, the corridors will provide links between their two last populations in the Iberian Peninsula, and will allow the possible population in Doñana, in the long term.

3.3. Procedure proposed by WWF/Adena

The chaotic situation currently suffered by the farmers, as well as the environmental damage of the nature cannot continue. It is undeniable that the agriculture has a great economical importance for Doñana's population. However, we have to be conscious of the importance of the natural capital from which this, and the other economic sectors in the Area are depending on. WWF/Adena proposes to set up a land use planning so as to guarantee the conservation of this natural capital. Within the Sustainable Development Plan for Doñana, the local agents have necessarily to reach a consensus and to decide whether exploitations to legalize or not, and where these have to be located.

3.3.1. Corridors restoration

WWF/Adena proposes to start up this planning procedure by the creation of corridors, moving the farms which are located within these areas. In principle, this represents a surface amounting 1,400 hectares of intensive crops from a total of 19,000 hectares which are occupying the proposed corridors, mainly in Public Forest Land. This surface would be moved to other areas environmentally considered as less sensitive and more accessible.

However, as it has been stated from the Doñana Biological Station, this surface could suffer some variations as it is yet necessary to delimit more precisely the corridors, based on orthophotos and on a higher fieldwork. WWF/Adena hopes that the Environmental Regional Authority (Consejería de Medio Ambiente) will develop this specific proposal in-depth.

We might emphasize that the transfer of the farms is not something new in Doñana; during the 90's, the farms from the Sector II of the Plan Almonte-Marismas, were moved in order to lower the impact they had on the La Rocina low track creek. The total transferred surface was similar to the one being considered for the corridors which have been studied.

While the agricultural exploitations are moved, it is necessary to restore the streams, to get back their natural bed, their riverside forests and their functionality. For this reason, the delimitation of the Hydraulic Public Territory from the area, will be very helpful. Afterwards, the other forest areas will have to be restored and it will be necessary to eliminate the introduced vegetation and to get back cork oaks, meadows and *matorral noble (shrublands)*.

These local-scale measures will have to go with other regional-scale measures so as to guarantee the functionality of these corridors and their aim at connecting the Doñana with Sierra Morena. The corridors will have to provide the appropriate protection to the Tinto River and the Candon stream, including them into the Natura 2000 Network and eliminating occupations, fences and alterations in their beds, and restoring the vegetation where necessary.



Peral-Previza Creek

In the same way, it will be essential to guarantee the continuity of the corridors in their junction with roads and railroads, by enabling ways for the fauna or by establishing speed limits for the cars driving on them.

The restoration of the corridors will require the involvement of the Environmental, Agriculture and Public Works Regional Authorities, and the Guadalquivir River Basin Authority, the Town councils (Local Authorities) and the affected Mancomunidades (Local communities), and obviously, of the farmers themselves.

3.3.2. Land use planning

As we already mentioned, the restoration of the corridors is meant to be the first step to make agriculture compatible with the conservation of the nature in Doñana. WWF/Adena is claiming a land use planning for Doñana in general, and for the strawberry area more specifically, for quite a long time. The aim is to define the agricultural surface definitively, and the way it can be assumed without losing natural capital, neither the values nor the services the nature of the *Area* are providing.

The land use planning should give priority to locate the exploitations which are outside the more sensitive environmental areas, and quite far from the creeks, in order to avoid direct negative impacts on the aquifer level. Subsequently, the farms should be moved, from one hand, to areas closer to existing roads so as to make the transport easier and to avoid the continuous demand of new asphalted agricultural tracks and from the other hand, closer to urban areas to get transport facilities and to make easier the workers' daily life.

All this change will mean to have a concentration of the agricultural space, and this is why it is particularly important to take appropriate environmental and landscape measures at the same time, to avoid a long continuous surface covered by plastic.

The procedure of land use planning in Doñana has to be participative and has to involve all the people involved in the management and use of the territory to guarantee the commitment of all of them, as well as it has to avoid a new chaotic situation and illegalities in the area.



Current territorial fragmentation of the strawberry area in Doñana (CHG, 2004)