# PUBLIC PARTICIPATION AND ICM IN THE COASTAL AREA OF GUADIARO AND GUADALQUITON

## 1. Introduction

The area analysed in this study, in spite of the fact is only about 5.000 has, contains one of the most important economical activities of the municipality of San Roque (Cadis). The luxurious touristic resorts give employment to local population and produce net income for public administration at all levels. Agriculture is a secondary activity, but also very important in the village of San Enrique.

Conflicts between economical activities and environmental protection are present. Pollution and residual discharge in water systems, from agricultural and urban use, cause the reduction of attractiveness for tourists. Erosion of the coastline, which is man induced, supposes loss of beach.

Many institutions, companies and public sectors have responsibilities or areas of interest in the zone. Stakeholders in the coastal zones are decentralized and dispersed. The absence of coordination between them increases the environmental damage, what finally will impact on economic activities. It is necessary to work in a context of Governance to ensure the persistence on time of touristic and agricultural activities.

The main goal of this essay is to explain a public participation process, between the principal stakeholders involved, where each one assume its own responsibility and tasks to solve the conflicts mentioned above. They carry out to reach a desired set of goals. The common objective is to reduce erosion and water pollution for the persistence on time of natural and man-made resources.

## 2. The area of Guadiaro and Guadalquitón[1]

The area of study (36º17'07 N/ 5º18'24 W) belongs to the Municipality of San Roque (Province of Cadiz, Andalusia). It is located in the Mediterranean coast of the province, close to the Strait of Gibraltar. It has an extension about 4'938 has, with a coastal line of 5'435 metres.

The area includes five villages:

| NAME | HABITANTS (2009 census) |
|---|---|
| Guadiaro & Nuevo Guadiaro | 5721 |
| Torreguadiaro | 1523 |
| San Enrique | 1080 |
| Sotogrande | 2177 |
| Sotogrande Port | 407 |

***Table 1:*** *Population*[2]

These five villages are located in the valley of the river Guadiaro, which source is in the mountains region of Ronda. One of its tributary, Genal, is one of the few rivers without artificial regulation in Spain. The flow of Guadiaro is high all the year, but

[1] See Annex: Map of the Area of Study

[2] Source: INE (National Institute of Statistic, Spain). During the summer, the population can double.

depending on inputs from rainfall, it presents two seasons: high level of water in winter, and low level of water in summer. It delivers about 581 $Hm^3$ of water per year from land to sea. The flow of water carries the sediment that it is deposited along the coast. The estuary presents low salinity level because of microtidal regimen of the Mediterranean ecosystem, but the tidal bore can travel up the river against the direction of the current to 4 kilometres, thanks to Atlantic Ocean influence. In periods of very low flow, the swell causes the interruption of the current in the estuary, closing the mouth with the formation of a spit bar. This process increases the eutrophication in the ecosystem.

The Estuary of Guadiaro is a Protected Nature Area by Andalusia's Government. It is a strategic point for migratory birds and also a place to stay during the winter for them. That is why it is also a Special Protection Area (SPA) under European Union Directive on the Conservation of Birds of 1979. Other important wetlands, as a stopover for resting and feeding for birds too, are the Torreguadiaro Lake, which is a coastal pond with water inputs obtained from rainfall, saltwater during hide tides and an irrigation channel, and the stream Guadalquitón. This brook still conserves the Mediterranean forest and the riparian vegetation, with lot of cork oats, carobs and ferns. It is also the habitat of some amphibian and reptile species. The estuary of Guadalquitón is formed by a split bar that retains freshwater. The coastal area around the stream shapes a free space without urbanisation and it is seldom visited. The conservation status of this zone is good, but it is classified as land for building development in the Urban Planning of San Roque.

The most visited beaches are those which are built-up, in Sotogrande Port and Torreguadiaro. Most of them are sandy beaches, except in the north of Torreguadiaro, which rocky platform is covert by sand the most part of the year.

| BEACH | LENGHT (meters) | WIDTH (meters) | OCCUPANCY LEVEL | LEVEL OF URBAN DEVELOPMENT |
|---|---|---|---|---|
| Guadalquitón | 1885 | 70 | Low | Isolated |
| Sotogrande | 2250 | 35 | Medium | Medium |
| Torreguadiaro | 1300 | 30 | High | Medium |

***Table 2:*** *Beaches*[3]

In the area of study there are historical resources too. Apart from signs of Phoenician civilisation in the estuary of Guadiaro, there are a military bunker in disuse in Guadalquitón, and two towers from XVI Century, built to defence the Christian territory against Moslems attacks. They give the name to the town of Torreguadiaro.

All the villages in the zone are well connected between them and also beyond the area of study. The principal road is A-7, or the Mediterranean highway, which starts in Cadiz and ends in Barcelona. In the map, it goes across the area from the southwest to northeast, connecting Sotogrande and Torreguadiaro. The road A-2100 connects Sotogrande with "Castellar de la Frontera", a village outside of the area of study, in the northwest, inside the Natural Park of Los Alcornocales. Two main roads are A-2103 and

[3] Source: Spatial Plan of *Campo de Gibraltar.*

A-2102, from Sotogrande to San Enrique, and it ends in "El Secadero", an agricultural village in the province of Malaga.

The principal economy activity in the area of study is the tourism. Sotogrande and Guadiaro & Nuevo Guadiaro are luxury modern touristic resorts, but the origin of the older villages (San Enrique and Torreguadiaro) begins in the ends of XIX century.

San Enrique was founded in 1887, when the Marquis of Larios founded the Industrial and Agricultural Society of Guadiaro with the purpose to work the fertile lands of Guadiaro Valley. The population increased and the agricultural space extended over the valley. Today, agriculture does not occupy the same area, but it is still the principal activity, and source of employment, in San Enrique. Moreover, in the last twenty years, rustic cottages companies are increasing in the village as an alternative for sun and beach tourism.

Torreguadiaro was a small fishing town in the beginning of XX century because of its proximity to the estuary of Guadiaro, a nursery area of the sea for fish and shellfish species. But the freshwater and marine pollution and the overfishing in the zone cause the profitability decreasing of the activity. Now, traditional fishing does not exist, just sport fishing in the coast.

Torreguadiaro and Sotogrande, plus Guadiaro and Nuevo Guadiaro are important tourist destinations in Spain, also for foreign people because its proximity to the airport of Gibraltar. Many people from near towns work in these villages. Even "Sotogrande S.A." is a company which play the market.

Sotogrande was founded in 1967 by Joseph McMicking whose intention was building a luxurious touristic-residential destination. Due to it is a touristic destination of high purchasing power, the economy is not very sensitive in view of an international financial crisis. It has four golf courses; one of them is the number one in Europe, six polo fields, and two clubs of tennis and padel. High standard hotels are also located in this town. Sotogrande Port is available for nautical sports, and it also has its own population living in its residential houses.

Nowadays, the two main problems in the area of study, as dangers for this complex system, are the freshwater and marine pollution and the changes in longshore sediment transport.

- WATER POLLUTION

  There are four Sewage Treatment Plants in the area of study, and three more are under construction to prevent pollution during the summer, when the population doubles in the villages. It is apparent that, with a good sewage treatment, the good quality of the waters is guaranteed. But upstream, there are discharges of untreated effluents, from agriculture, industrial and urban activities, that cannot be treated in the Sewage Treatment Plants of San Enrique, Sotogrande or Guadiaro. The polluted freshwater arrives to the Mediterranean Sea, plus untreated effluents from Torreguadiaro.

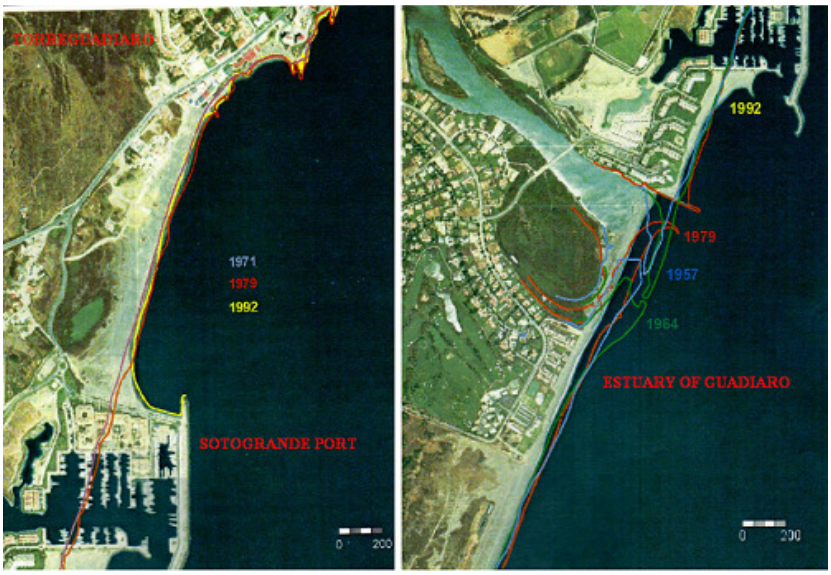
Moreover, during the summer, when the level of water in the Guadiaro is the lowest, the spit bar in the mouth closes the estuary, thanks to wave action, and it increases the eutrophication in the estuary ecosystem. Several times, the Government decided to dredge the mouth to prevent episodes of contamination.

The water pollution can affect the estuary and marine ecosystems, in terms of biological life, and it also can affect the health of the residents. Furthermore, it is a risk for tourism, the main economic activity in the zone, because bad smell and dirtiness reduce attractiveness for tourists.

- CHANGES IN LONGSHORE TRANSPORT

The predominant direction of the current was from North to South. The presence of Sotogrande Port changed the sedimentary transport by the creation of a new current in the other direction, from South to North.

The result is intense deposits of sand between the port and Torreguadiaro, and the predominance of erosion from the estuary of Guadiaro to beaches in the South.




Due to the new deposits in Torreguadiaro, this marine lagoon could change to a freshwater lagoon. The flora, which depends in seawater intrusion by tides and wave action, would be in danger. Therefore, the entire ecosystem supporting by autotrophies would be damage too.

The erosion in the South is also intensified by extractions for building material, dredging works to prevent contamination in the mouth of the estuary and water extraction by urban and agricultural activity.

Erosion supposes loss of beach width in the area of Guadalquitón, a well conserved coastal zone, and it also supposes an exposure of property to flood damage. There are revetments in front of the nearest residential houses to the coastline. In this way, the tourism activity is in danger again.

## 3. Basic Settings of the Research

The first step for the establishment of a public participation process is to identify the main stakeholders under the area of study. They shape a group of heterogeneous interests and diverse perspectives projected in the coastal area of Guadiaro and Guadalquiton.

Some of the stakeholders are private companies and some of them are public institutions, whose managers follow different goals and work in different ways. Private sector wants to sell a product of good quality (hotels, port, restaurants, products from the agriculture), and the public sector try to protect the collective public values and resources (streams, beaches, healthiness, land uses). Furthermore, other stakeholders involve are specific groups interesting in conserve their employment (trade unions), their place for vacation (residents), or they are worry about damage in the ecosystems (ecological groups). Scientists appear as the key to provide information as external experts.

| STAKEHOLDERS | | | RESPONSABILITIES / AREAS OF INTEREST |
|---|---|---|---|
| Governmental Institutions | STATE | Ministry of Environment and Rural and Marine Domains | Coastal-Marine Public Domain: estuaries of Guadiaro and Guadalquitón, beaches, Public Domain of Sotogrande Port<br>Quality of marine and coastal waters[4] |
| | | Ministry of Defense | Bunker in Guadalquitón |
| | REGIONAL (ANDALUSIA) | Port Authority of Algeciras Bay | Activity of Sotogrande Port |
| | | Regional Ministry of Agriculture and Fisheries | Agriculture in San Enrique |
| | | Regional Ministry of Housing and Spatial Planning | Development, Environmental Planing, Regional Planning, etc. In general, land use planning |
| | | Regional Ministry of Environment | Protected Nature Area "Estuary of Guadiaro"<br>Streams: Guadalquitón and Guadiaro (Malaga-Cadiz) |
| | | Regional Ministry of Culture | Watchtowers, from XV century |
| | | Regional Ministry of Tourism, Commerce and Sport. | Sun and Beach tourism.<br>Golf activity, polo, nautical sports, sport fishing in the coast.<br>Ecological and cultural tourism. |
| | LOCAL | Local Government of San Roque | Beaches clean-up<br>Urban Planning<br>Sewage Treatment |
| Local agents | Trade Unions | Crop Farmers | Agriculture, specially availability of freshwater |
| | | Workers in hotel industry and commerce | Persistence on time of tourism activity |

[4] There is no baseline in the area of study due to territorial conflicts between Spain and Gibraltar. So it could not be possible to establish the responsibilities of management in coastal waters to the Regional Government and management in marine waters to the State. However, the State has the responsibility in marine and coastal waters quality by the Marine Strategy Framework Directive of Europe (2008).

| | | |
|---|---|---|
| | Residents | Attractiveness, communications, residencial houses |
| | Large touristic companies | Luxurious hotels, golf, polo, nautical sports in Port of Sotogrande |
| | Medium-Small touristic companies | Sun and Beach tourism and Rural tourism |
| | Ecological Groups | Damage in ecosystems: pollution, erosion, biological life |
| Scientists | Natural, Social and Economic Sciences | To provide information for managers |

***Table 3**: Stakeholders and their responsibilities and/or areas of interest*

## 4. Basic Problems Encountered

The principal obstacle of public participation is the absence of a well information flux between the stakeholders. This finally results in insufficient coordination between them, overall in conflicts between public and private interests, what increase environmental problems and risks.

Public participation is needed in order to solve the main environmental problems of the area under study:

1. **Water pollution**: Episodes of pollution in Guadiaro can affect the estuary and marine ecosystems, in terms of biological life, and it also can affect the health of the residents. Bad smell and dirtiness also reduce attractiveness for tourists.
2. **Changes in longshore transport**: Erosion supposes loss of beach width in the area of Guadalquitón, a well conserved coastal zone, and it also supposes an exposure of property to flood damage.

The main obstacle regarding the extent and quality of public participation to solve the problems explain above is the absence of coordination.

Most of the institutions involve, at regional level, are centralized in Seville, so they are not directly informed about what happen at local level. At national level, the Ministry of Environment has one of its subdivisions in the town of Cadis, and it operates dredging the mouth of Guadiaro when the press talks about an event of pollution in the newspapers. This is a reactive management of the problem, giving a solution in a short period of time. Moreover, when the mouth is dredge, pollution goes from the mouth of the river to the coastal waters, moving the problem from one place to another, where the National Ministry will may take part again because its responsibility in marine waters quality.

Provinces are the worst interconnected institutions. In spite of the fact that pollution in Guadiaro is directly correlated with the residual discharges upstream from the province of Malaga, the management is based in the building of more sewage treatment plants only in the mouth. This is because Integrated Coastal Area-River Basin Management (ICARM) does not exist. The subdivision of the Regional Ministry of Environment in Malaga has not got information about the pollution events in Guadiaro.

Apart form this, private sector take its own decisions regarding in a short time period. They want to build-up in the coastline and they make projects to extend the port without listen the warning from the Administration about the increase of erosion that this development can provoke. Furthermore, they are not so transparent in their

business, what increase distrust and suspicious in the local population and ecological groups.

Finally, it is necessary to say that scientists are not listened from the managers in private and public sectors. But they have privileged information as external expert that can give support in a public participation process. Managers must consult the experts in the University who work in producing more information about environmental problems like water pollution and changes in longshore transport. Furthermore, they are who have the experience in public participation processes.

## 5. Provision and Solutions to Solve Identified Problems

Due to insufficient coordination between stakeholders, some actions are needed to reduce the environmental problems in order to guarantee the coexistence between natural and man-made resources.

Public participation could be perfectly assumed by all the sectors involve. A list of actions that must be executed by each sector, in order to achieve common goals, is following. This list need to be revised by all the stakeholders to put their ideas together, but it is a good start point. Scientists must be the guides of the process.

Common objective:

To guarantee the coexistence between natural and man-made resources, reducing water pollution and reducing erosion in the area of study.

Actions: Actions are put into three groups depending on the goals to achieve. Furthermore, numbers are given for each action to express the priority to execute them (1 is the most priority, 4 is the least priority).

*Goal 1*: *Control and reduction of the residuals discharges in the river of Guadiaro*

1. *Establishment of sewage treatment plants upstream of Guadiaro*.

The Water Agency of Andalusia, which is a department of the Regional Ministry of Environment, must urge local governments to build the necessary sewage treatment plants in the municipalities upstream of Guadiaro, especially in the province of Malaga.

2. *Legalisation of water discharges from agricultural activity, reducing the use of pesticides*.

The Regional Ministry of Agriculture must try to reach an agreement with the trade unions of crop farmers in order to reduce levels of pesticides, or illegal activities of water discharges would be fined by the Regional Ministry of Environment.

*3. Cleaning actions in the stream and its mouth.*

For cleaning actions is easy to coordinated the efforts of the municipality of San Roque, National Ministry of Environment and Regional Ministry of Environment through a collective agreement, what would reduce the investment in cleaning operations because it is divided into three parts.

4. *Design of a simple system of vigilance to warm about pollution episodes.*

The port of Sotogrande is closed to the mouth of Guadiaro. The staff of the port can be train to advertise signals of pollution episodes. When they detect the alarm, they would call the local government in order to begin with cleaning actions.

*Goal 2*: *Change of the management in the mouth of Guadiaro, as a Nature Protected Area.*

1. *Change of policy of sand extraction in the zone.*

It is necessary to stop the extractions of sand in the mouth of Guadiaro because erosion will increase. The National Government of Environment, then, would not loss the amount of money invest in dredges and it could use this money for cleaning actions.

2. *New limits for the Nature Protected Area.*

The management of the Nature Protected area can be made, in a coordinated way, by the National and Regional Ministries of Environment if its limits coincide with the Maritime-Terrestrial Public Domain.

3. *Renovation of the infrastructure of public use.*

The infrastructure of public use is in poor conditions. It must be renovated by the Regional Ministry of Environment.

4. *Control of the activity in Sotogrande Port.*

Sotogrande Port is part of the Port Authority of Algeciras Bay, but in practice, they are separated. The Port Authority must pay more attention to the activities in Sotogrande Port, especially the residential use what it can not increase anymore.

*Goal 3*: *Coordinated spatial planning of the free space in the area without built-up (Guadalquitón).*

1. *Setback operations*.

The idea is to demolish the houses in the coastline located in the south of Sotogrande in order to increase beach width. A part of the free space next to these houses, which is destined to build-up in the future, must be reserve to build the demolished houses.

This is the most difficult action to achieve. It is necessary that the residents, the company of Sotogrande S.A., the Regional Ministry of Environment, the Regional Ministry of Spatial Planning and the Government of San Roque agree to cooperate.

2. *Protection of the forest associated to the stream Guadalquitón against urbanisation.*

The Regional Ministry of Spatial Planning must keep informed the Local Government of San Roque about the importance of protecting the forest associated to

Guadalquitón and keep it as a free space of ecological tourism. It is necessary to declare the forest as a non-urban area, and only the Local Government can do it.

3. *Promotion of ecological tourism in this area*.

The bunker in Guadalquitón is not used by the Ministry of Defence. In Cadis, many actions coordinated between the Regional Ministry of Environment and the National Ministry of Defence were done. So, it is possible to translate the responsibility of the bunker to the Regional Ministry of Spatial Planning to change the military use of the bunker as a viewpoint. Moreover, a path can be build from the forest to the bunker, and along the coast, by the Regional Ministry of Environment.

This list provided must be seen as a start point for a public participation process. It is necessary to include all the stakeholders, include in the table 3, during the process, even if they are not mentioned in the actions and goals. Fluxes of information between the stakeholders finally will develop an open and clear process of public participation.

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**Bibliography:**

Carrilero Millán, M. 1996. Phoenicians in Oriental Andalusia: Ten years of scientific research (1982-1992).

Government of San Roque. 2005. Urban Development Plan of San Roque.

Ministry of Environment of the Government of Andalusia, 2008. New geospatial borders in the Protected Nature Areas of Cadiz.

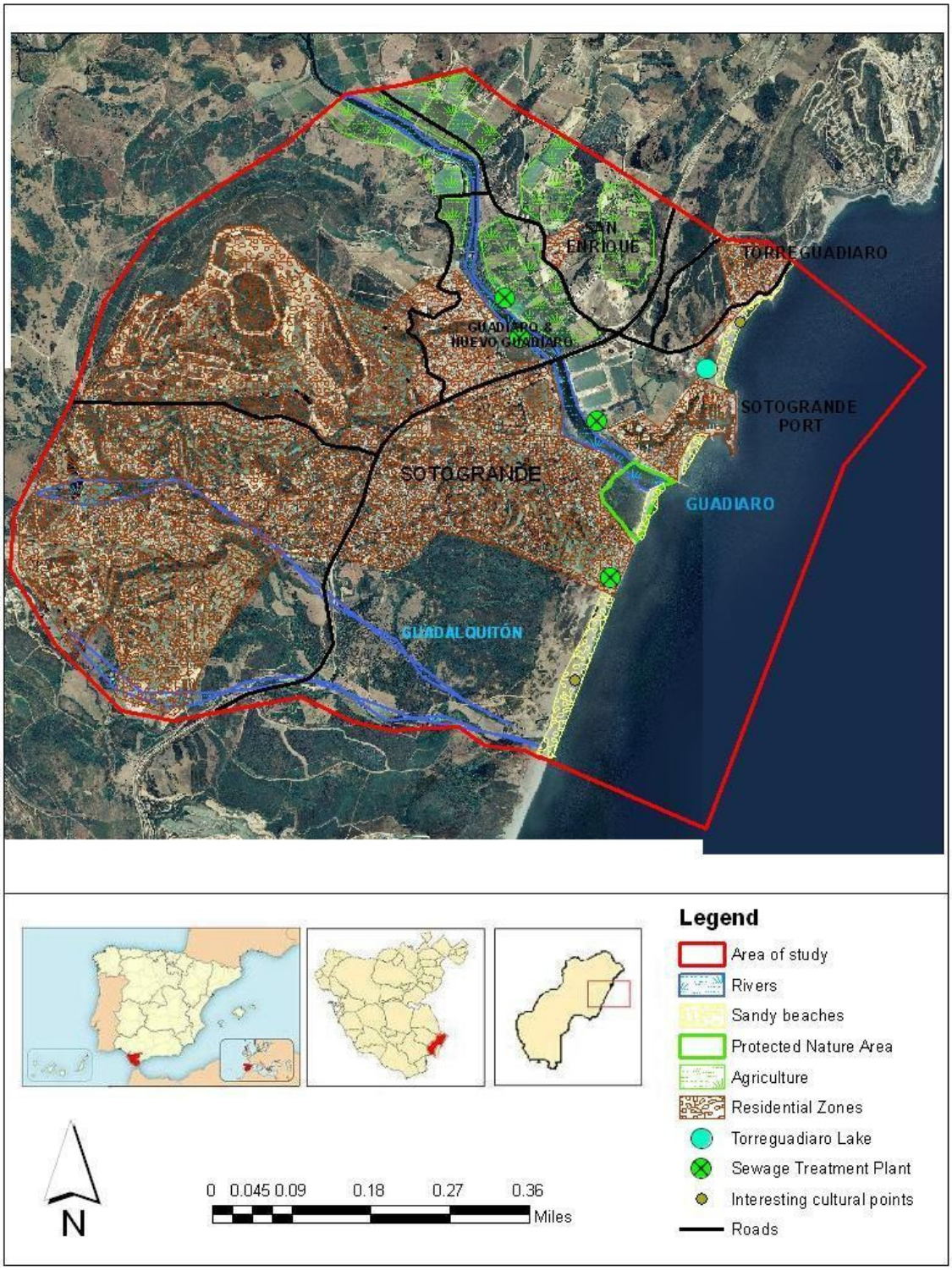
Ministry of Environment of the Government of Andalusia. 2008-2012. Wetlands Plan of the Province of Cadiz.

Ministry of Housing and Spatial Planning of the Government of Andalusia. 2007. Spatial Plan of Campo de Gibraltar.

Scientific research group in ICM of the University of Cadiz. 2009. Case study in Integrated Coastal Management: River Guadiaro.

**Internet sources**

http://www.sanroque.es/tourism/view?set_language=en (visited: February 11, 2010)

http://www.ine.es/en/welcome_en.htm (visited: February 4, 2010)

# ANNEX: Map of the area of study